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Significant Surpluses: Weapons and Ammunition Stockpiles in South-east Europe

Pierre Gobinet

RASR
The Regional Approach to Stockpile Reduction

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About the RASR Initiative

The Regional Approach to Stockpile Reduction (RASR) is a long-term, coordinated, regional approach to address the threats posed by excess, unstable, loosely secured, or otherwise at-risk stockpiles of conventional weapons and munitions.

RASR encourages affected governments and relevant organizations to develop a proactive, coordinated, regional approach to securing and destroying small arms and light weapons by building local capacity, sharing best practices and lessons learned, and synchronizing resources in order to maximize their efficiency.

The ultimate aim of the RASR initiative is to prevent disastrous explosions or destabilizing diversions of conventional weapons and munitions.

For more details, visit www.rasrinitiative.org or email info@rasrinitiative.org.

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Abbreviations and acronyms

AAF	Albanian Armed Forces
AF BiH	Armed Forces of BiH
ARM	Armija na Republika Makedonija (Army of the Republic of Macedonia)
ASS	Ammunition storage site
ATA	Ammunition technical assessment
AUW	All-up weight
BAM	Bosnian mark
BGN	Bulgarian lev
BiH	Bosnia and Herzegovina
CAF	Croatian Armed Forces
CSTMB	Central Storage and Technical Maintenance Base
DAER	Daily ammunition expenditure rate
DTRA	Defence Threat Reduction Agency
ESH	Explosives storehouse
EU	European Union
EUFOR	EU Force
EUR	Euro
EWG	Expert Working Group
FYROM	Former Yugoslav Republic of Macedonia
ITF	South-Eastern Europe Mine Action Coordination Council
LTDP	Long-term Development Plan
MANPADS	Man-portable air defence systems
MKD	Macedonian denar
MLRS	Multiple-launch rocket system
MoD	Ministry of Defence
MoI	Ministry of the Interior
MoND	Ministry of National Defence
MONDEM	Montenegro Demilitarization

NAMSA	NATO Maintenance and Supply Agency
NATO	North Atlantic Treaty Organization
OB	Open burning
OD	Open detonation
OSCE	Organization for Security and Co-operation in Europe
Plan 2004	Plan for the Organizational Development of the Bulgarian Armed Forces
Programme of Action	UN Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects
PSSM	Physical security and stockpile management
RACVIAC	Regional Arms Control Verification and Implementation Assistance Centre
RASR	Regional Approach to Stockpile Reduction
RDX	Cyclotrimethylene trinitramine
RSD	Serbian dinar
R3	Recycling, re-use, and recovery
SAF	Slovenia Armed Forces
SALW	Small arms and light weapons
SEE	South-east Europe(an)
SEESAC	South Eastern and Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons
SFOR	Stabilization Force
TA	Technical agreement
TOE	Table of Organization and Equipment
UNDP	United Nations Development Programme
VF	Federation Army
VRS	Army of the Republika Srpska
UK	United Kingdom
US	United States
USD	US dollar
VCG	Montenegrin Armed Forces
WSS	Weapons storage site

Introduction

The Small Arms Survey compiled this *Special Report* in support of the Regional Approach to Stockpile Reduction (RASR) initiative. The RASR initiative intends to contribute to South-east European (SEE) security by preventing disastrous explosions in weapons and ammunition stockpiles, and addressing the destabilizing diversion of stockpiled conventional weapons and ammunition.

This *Special Report* is designed to provide regional physical security and stockpile management (PSSM) stakeholders with a clear, concise, and comparative overview of SEE's weapons and ammunition stockpiles, and the current state of stockpile reduction activities in the region. It is a direct response to the First SEE RASR Workshop, held between 5 and 7 May 2009 in Zagreb, Croatia and hosted by the US government.

The Zagreb workshop included a wide range of PSSM stakeholders from the region. During the course of the meeting, they identified five domains where the RASR initiative could facilitate greater coordination among regional actors involved in conventional weapons reduction:

1. national and regional policy: to highlight impediments to regional stockpile reduction;
2. infrastructure: the need to further develop and expand regional stockpile destruction centres;
3. training, education, and capacity building: to build capacity and enhance regional confidence;
4. sharing of information and best practices: to facilitate the spread of proven stockpile reduction methods; and
5. standardization: to improve coordination and facilitate coordinated approaches to stockpile reduction (including the sharing of technical information).

Among other important topics, regional PSSM stakeholders identified a number of critical issues that have hindered the development of a regional approach to stockpile reductions. These include the lack of awareness and support from national policy-makers, a lack of donor coordination, and low

levels of trust between governments. PSSM stakeholders also highlighted the scarcity of information on the size and content of stockpiles in each country in the region, and suggested prioritizing high-profile, 'quick-win' projects, such as destruction events or stockpile security improvements. These events and improvements would aim to generate momentum and political will for further stockpile reduction efforts. Stakeholders recognized the need for information exchange, transparency in technical and policy mechanisms, and the standardization of ammunition classification, in addition to ammunition surveillance systems.[1]

Responding to the concerns and aspirations of the Zagreb workshop's stakeholders, and addressing the RASR objective of increasing regional stockpile transparency and cooperation, this *Special Report* compiles the latest surplus stockpile figures provided by RASR participating countries (as of May 2011).

It presents recent stockpile data in a clear and comparable form, including within its scope comparative stockpile estimates, acknowledged PSSM priorities, and the significant efforts that certain regional countries have made to enhance transparency through the sharing of stockpile data. The data contained in this publication has been compiled from the following sources:

- previously published small arms and light weapons assessments performed in the region by international PSSM and explosive ordnance disposal experts;
- presentations given by the representatives of SEE ministries of defence (MoDs) and international organizations during various regional PSSM workshops;
- working group discussions during regional PSSM workshops; and
- the Small Arms Survey PSSM questionnaires returned by eight MoDs to the RASR research team during the first quarter of 2011.[2]

To facilitate regional comparison, this *Special Report* presents a series of country case studies organized into thematic sections. Each case study presents a short historical narrative, followed by available stockpile figures. Despite efforts to ensure comparability between country case studies, however, cross-country comparison is complicated by the significant variation in the level of detail provided by country MoDs. Some states, for example, stated simply that their stockpile information was classified. Others, in contrast, provided comprehensive breakdowns of their surplus weapons and ammunition holdings.

The respective MoDs in the countries featured in this publication have authorized all data for public dissemination.

National transparency and data on surplus stockpiles

The identification of surplus weapons and ammunition in a national defence stockpile remains very much a national prerogative. The primary obstacle to understanding surplus stockpiles in SEE is, therefore, a lack of transparency on the part of national authorities. The Organization for Security and Co-operation in Europe (OSCE) 'Best Practice Guide on the Definition and Indicators of a Surplus of Small Arms and Light Weapons' defines small arms and light weapons (SALW) surplus as:

> *The quantity of SALW exceeding the defence stockpile, i.e. the total number of (a) SALW assessed nationally as needed by active and reserve units of all military and security forces, plus (b) SALW in the reserve stock* (OSCE, 2003b, p. 3).

It proposes general guidelines on how to determine the size, structure, and requirements of military and security forces, but stresses that:

> *It is for each state to assess its own security situation in accordance with its legitimate security needs and to decide on the size and structure of military and security forces in order to achieve its constitutional tasks* (OSCE, 2003b, p. 2; original emphasis).

OSCE member states are thus free to apply criteria of their own to assess whether a stockpile is in surplus. In response, many SEE states have viewed surplus as a purely national concern and have seen neither a reason nor taken responsibility for making available information on surplus stockpiles.

Many states also consider surplus stockpile information to be militarily sensitive. In SEE, as in many other regions, there is a 'culture of secrecy', in which states often view surpluses as a potential reserve of weapons and ammunition for use in time of war and therefore the subject of national security. This has led to reticence on the part of many states to reveal information pertaining to the size and composition of their weapons and ammunition stockpiles. Insufficient

national stockpile data, which reflects a legacy of poor stockpile accounting practices, further effects the ability of states to divulge stockpile data.

National stockpile data sensitivity has arguably impeded the willingness and capacity of states to report PSSM data to the RASR initiative. Macedonia, Romania, and Slovenia, for instance, returned incomplete Small Arms Survey PSSM questionnaires, answering questions generically and omitting critical figures. In cases such as these, the complexity of government organizations in charge of military logistics and their ongoing reorganization certainly have an impact on poor accounting, the ability to report accurately, and the resulting stockpile opacity. It is in some instances clear, however, that national MoDs have not wished to divulge stockpile information multilaterally (i.e. more publicly), preferring instead to share information bilaterally with a PSSM donor country.[3]

Despite such factors inhibiting transparency, however, the data supplied by states to the Small Arms Survey confirms that many RASR participating countries have improved their surplus identification processes and transparency. Several states now provide increasingly detailed breakdowns of their surplus weapons and ammunition stockpiles rather than the rough, order-of-magnitude estimates that characterized past reporting. This suggests that surpluses are no longer estimated,[4] but are increasingly being *calculated* according to the composition, condition, and size of the national stockpile. The increasing attention that RASR countries pay to calculating and declaring surpluses appears to take a number of forms:[5]

- *Declaratory.* The government declares its surplus unilaterally. The anticipated excess, obsolescence, and instability of a stockpile are cited as important criteria for surplus identification. This gives predominant voice to the host country, but donors may negotiate for the inclusion of specific ordnance.
- *Technical.* Equipment becomes surplus following the acquisition of newer, more modern ordnance.
- *Economic*. Surplus needs to be destroyed to spare the expenses of maintaining and guarding inventories.
- *Strategic and doctrinal*. The process of resizing and restructuring armed forces inevitably leads to weapons and ammunition becoming surplus. All the RASR participating countries have experienced drastic reductions in

the size of active duty forces. Reserve forces were sometimes reduced at a slower pace and were often kept at exaggerated levels to justify retaining a large part of military arsenals (Faltas, 2008, p. 83; Karp, 2008, p. 85). The ratio of weapons to soldiers has been reduced.[6] Establishing a new force structure is thus an important initial step in delineating surplus ordnance. Some items can even be earmarked as surplus *before* the new force structure is implemented.

Despite this trend towards increasing willingness to calculate and report national stockpile surpluses, many states have yet to reveal detailed information about how they calculate surplus.

Most MoDs distinguish among ordnance that is in active service, in reserve, or in surplus. In this respect, small arms and light weapons surplus is generally defined as items that remain available in stockpile stocks after weapons and ammunition requirements have been allocated for (1) active service, (2) the war reserve,[7] and (3) training.

In their responses to the Small Arms Survey questionnaire, however, SEE MoDs provided little indication as to how they calculate these requirements. Some countries mentioned using a classified formula, but did not disclose daily ammunition expenditure rates (DAERs)[8] or allocation ratios. Furthermore, MoDs did not mention whether production ammunition[9] was taken into account in their calculations.

Main findings of the study

The following sections present the main findings from the country case studies in this *Special Report*.

Surplus volume estimates

- The levels of surplus ordnance in SEE are highly dynamic because of the ongoing restructuring of SEE military organizations, the modernization of small arms and light weapons[10] in use by SEE armed forces, and the continuously changing nature of the national defence stockpile. The surplus figures provided in this *Special Report* are valid as of May 2011, but will have changed by the time of publication.
- Countries that host extensive donor-funded PSSM assistance programmes, sometimes involving intrusive stockpile depot assessments by international experts, declare the most detailed surplus weapons and ammunition figures.
- Available data shows that NATO membership does not systematically guarantee more transparency in surplus stockpiles. The RASR initiative focuses on the six countries of the former Yugoslavia (two of which, Croatia and Slovenia, have joined NATO), in addition to three countries in the region—Albania, Bulgaria, and Romania—that recently joined NATO.
- This *Special Report* focuses almost exclusively on MoD surplus holdings.[11] However, a state's defence stockpile is the sum of all small arms and light weapons, and its associated ammunition needed for the defence and security of the state; it includes ordnance for the military, security forces, police, and reserve. In all RASR countries, MoDs and ministries of the interior (MoIs)[12] regulate small arms, light weapons, and ammunition holdings. Responses to the Small Arms Survey PSSM questionnaire (1) indicate that MoDs and MoIs keep separate surplus records, and (2) highlight the absence of a comprehensive accounting, monitoring, and planning system that covers service-life documentation for the entire national stockpile.[13]

- Surplus stockpiles do not systematically decrease in time because military reform and new acquisitions (and the consequent displacement of old stocks) create a steady flow of surplus ordnance.
- Surplus ammunition stockpile figures (see Table 1) in RASR participating countries can usefully be considered in relation to the US demilitarization stockpile of obsolete conventional munitions, calculated at 453,005 tons[14] in 2010 (NIAG, 2010, pp. 81–82).
- Countries do not always specify whether their figures reflect tons (US), metric tonnes, or gross weight (also known as tonnes all-up weight, or AUW) to declare their surplus. This makes accurate estimation of surplus by stated volume problematic (see Table 1). Logistic planning for demilitarization,

Table 1 Surplus ammunition stockpiles in RASR participating countries, 2011 (metric tonnes, unless stated otherwise)

	Total stockpile	Needs	Declared surplus in 2011
Albania	100,000[15]	15,000[16]	69,715[17]
Bosnia and Herzegovina (BiH)	29,200[18]	7,500[19]	21,700[20]
Bulgaria	153,000 (in 2008)[21]	N/A*	15,000[22]
Croatia	169,880,316 rounds or 3,400 (tonnes AUW) small arms ammunition (14.5 mm and below) in 2009[23]	Classified in 2011[24] 17,000[25]	20,000[26]
Macedonia	N/A	10,000,000 rounds (7.62 and 7.9 mm)[27]	No tonnage provided, but more than 360,000 items[28], including 291,000 items in class 5[29]
Montenegro	7,000[30]	2,500[31]	4,500[32]
Romania	N/A	N/A	N/A
Serbia	N/A	N/A	8,712[33]
Slovenia	N/A	N/A	N/A

* N/A = not available.

Note: The country case study sections in this *Special Report* provide detailed breakdowns of the above figures, if available.

Table 2 Small arms and light weapons surplus stockpiles in RASR participating countries, 2011 (pieces)

	Total stockpile	Needs	Declared surplus in 2011
Albania	N/A*	N/A	258,992[34]
BiH	76,000[35]	24,143[36]	53,000[37]
Bulgaria	500,000 end of 2004[38]	N/A	46,577 small arms in 2008[39]
Croatia	260,689 Croatian Armed Forces + 93,000 MoI in 2006[40]	Classified in 2011[41] 69,000 in 2006[42]	0[43]
Macedonia	Unclear[44]	Unclear[45]	N/A
Montenegro	28,000[46]	15,000[47]	13,000[48]
Romania	N/A	N/A	1.25 million in 2004[49]
Serbia	N/A	N/A	More than 90,000[50]
Slovenia	N/A	N/A	N/A

* N/A = not available.

Note: The country case study sections in this *Special Report* provide detailed breakdowns of the above figures, if available.

for example, traditionally uses gross weight (or tonnes AUW[51]) as a reference, which includes the ammunition *and* its packaging. In addition, there are differences between US and UK tons.[52] Unless otherwise stated, this *Special Report* assumes that RASR countries provided figures in metric tonnes.[53] Furthermore, small arms, light weapons, and ammunition are often counted as 'pieces' rather than by weight.

Storage sites and conditions

Location

- 'Prospective'[54] weapons and ammunition storage sites are sites that will remain as permanent storage sites after all surpluses are disposed of. The overall tendency is to reduce ammunition storage sites (ASSs) and weapons

storage sites (WSSs) to a few prospective locations in order to reduce storage and staffing costs.

- MoDs must use a range of (often contradictory) factors to determine the location of prospective ammunition stockpiles. They should be positioned (SEESAC, 2004a, p. 5):
  - in wide-open spaces to minimize the impact of a depot explosion on the surrounding population centres, environment, or industrial sites;
  - close to roads and highways to facilitate transport and access;
  - in the same barracks as the security forces that use them for simplified logistics, ease of supply, and greater security and access control;
  - away from international borders; and
  - close to disposal facilities to reduce transport costs.
- Distinct factors (UNDP, 2009, p. 17) are used to determine whether the risks from ammunition and explosives to people and facilities are as low as reasonably practicable, i.e.:
  - the quantity, nature, and condition of ammunition and explosives;
  - the distance between explosives facilities and people/other facilities;
  - the type of building constructions involved; and
  - the length of time people are exposed to risk.

Condition of stockpiles

One of the key areas where expert assistance seems most needed is during the assessment of the condition of stockpiles. The data provided by SEE MoDs for this section can be categorized into three major domains (Mihelič, 2011):

- *Physical security.*[55] MoDs generally acknowledge the importance of the measures recommended by the OSCE 'Best Practice Guide on National Procedures for Stockpile Management and Security' (OSCE, 2003a). What is not always made clear is whether surplus stockpiles benefit from the same security measures as operational stockpiles.
- *Physical condition of the depot.* Significant quantities of ordnance are still stored in the open. Rain, dampness, and humidity speed up the degradation of ammunition and can cause it to become dangerous to handle. Some MoDs

acknowledge that they can never achieve 'NATO standards' of ammunition storage infrastructure without substantial donor support. Yet trying to achieve 'NATO standards'[56] of storage or ammunition management is not always the best way forward. A number of ammunition technical assessments (ATAs) show that certain preliminary measures can be taken by states to reorganize their stockpiles *before* they ask for donor funds. This includes palletizing ammunition, installing warning signs and symbols, applying safety distances for the storage of explosives, and classifying them according to hazard divisions and compatibility groups[57] to ensure correct segregation during storage and transportation.

- *Surveillance and proof.* Trained personnel should carry out periodic technical inspection and chemical analysis of stocks of high explosives and propellants[58] to ensure safety and stability. Such personnel allocate codes that classify the ammunition according to its condition and specify whether it is safe and serviceable, redundant, unstable, unreliable (pending a technical investigation), or subject to destruction (SEESAC, 2004a, pp. 2–3). The ammunition condition coding of the Defence Threat Reduction Agency (DTRA) is often referenced by assessment teams (see Table 3).

A number of points can be made in this regard:

- None of the RASR states' responses to the Small Arms Survey questionnaire refers to its respective MoD's systematic use of an ammunition coding system.

Table 3 DTRA ammunition condition coding

Risk	Description
High	• >20 years old • Not in original packaging • Wartime production
Moderate	• >15 years old • Returned from the field, incomplete storage history, and/or poor storage conditions
Low	• <15 years old • In original packaging

Source: EWG (2010b, slide 7)

Even if these codes exist, there is no indication that they are standardized among RASR countries. The types of categorization reported by MoDs appear to be rudimentary, including 'operation', 'reserve', 'for sale', or 'for demilitarization/destruction'.

- A number of technical assessment reports stress that shelf life[59] only provides an indication of the *performance* of ammunition, not necessarily of its safety and stability in storage (Wilkinson, 2006, p. 231). This suggests that governments have tried to use a stockpile's expired shelf life as a justification to request donor support.
- Propellant master samples often cannot be relied upon because the bulk of the ammunition has been kept under different, 'less than ideal' conditions.

Surplus value

Psychology should not be underestimated as a source of opposition to destroying surplus stockpiles. Regardless of the fact that surplus ammunition may be unserviceable, unsaleable, and costly to stockpile, many decision makers in RASR participating states regard surplus as an asset. They do not view the destruction of surplus as a politically viable option because of a range of spurious beliefs, including that surplus is national property that could bring money into the country or that it retains value as a national 'insurance' policy in the event of conflict. In reality, profitable surplus disposal methods include resale and recycling possibilities that can offer greater rewards to countries than the retention of unserviceable and decaying surplus stockpiles.

- RASR participating countries report differently in relation to their arms exports, but with increasing levels of transparency.[60] National export reports do not, however, disaggregate sales of surplus from sales of new ordnance.
- Surplus sales are often encouraged by national legislation. Most countries highlight that there is decreasing demand for surplus ordnance and that most modern militaries are not interested in buying old equipment. UN embargoes, EU restrictions, the saturation of markets for certain weapons types, and strong international competition ultimately limit the customer base for surplus matériel and also create greater transfer delays (Lazarevic,

2010, fn. 22). Regardless of these factors, all RASR participating states report that they first test the marketability of their surplus stocks before deciding to destroy them.

- RASR participating states with large-scale demilitarization processes apply recycling, re-use, and recovery (R3) techniques to reduce destruction costs and encourage profit making. Scrap metal resulting from the incineration of small arms ammunition and constituents (propellants and explosives) resulting from the dismantling of mortars and large-calibre ammunition (>75 mm) are usually sold, recycled for civilian use, or destroyed if unsuitable for recycling. The market for recycled explosives, such as repackaged TNT, seems more limited than that for scrap metal.

Estimated cost to defence budgets

In 2010 Eastern Europe's estimated total military expenditure was USD 65.5 billion. Almost all Balkan countries reduced their military spending. For example, Bulgaria reduced its military expenditure by 28 per cent from 2009 and Albania by more than 10 per cent (Perlo-Freemann et al., 2011, p. 186). In light of this trend, RASR participating countries acknowledge the importance of identifying the true costs of stockpile management, including security, personnel, storage facilities, maintenance and repair,[61] and final disposal.[62]

- Most SEE countries seem to realize that after a few years, storage costs can equal destruction costs. Yet there is no indication in RASR participating states' responses to the Small Arms Survey questionnaire that their financial accounting systems can independently identify (i.e. *calculate*) whether the disposal of obsolete ammunition (rather than continued storage) is a cheaper option in the mid- to long term. In 2006, using SEE as a case study, the UN Institute for Disarmament Research and the South Eastern and Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons (SEESAC) developed a cost-benefit analysis model for use in the storage of small arms, light weapons, and ammunition. Its goal was to allow SEE states to estimate the real annual costs involved in the storage of ammunition and weapons and compare them to the potential benefits from sale. The model

was based on the requirements of NATO storage standards (Turner, 2006). There is no indication that RASR participating states use either this model or similar software.

- Some RASR participating countries state that they do not spend anything on storing or guarding surplus ordnance, because conscripts guard their depots. Governments that have abolished conscription have a different view: when professional soldiers replace conscripts, the cost of guarding depots rises unexpectedly. A number of governments have turned to private security companies to protect national stockpiles.

Priorities for destruction

Severely degraded or damaged explosive materials, and poorly secured, highly sensitive weapons such as man-portable air defence systems (MANPADS) can usually be prioritized for destruction on the grounds that they pose the greatest risks in terms of unplanned explosions or proliferation. However, in their responses to the Small Arms Survey questionnaire, RASR countries did not always specify whether they were capable of systematically prioritizing future ammunition destruction.

On the whole, munitions containing white phosphorous are repeatedly mentioned as a particular PSSM challenge due to their instability, which can lead to spontaneous combustion or detonation, even following a destruction effort.

Albania

Background

In 1997 the collapse of the Albanian political system led to the looting of an estimated 550,000–650,000 small arms and light weapons, more than 1.5 billion rounds of ammunition, 3.5 million hand grenades, 3,600 tonnes of explosive devices, and one million mines from military stockpiles (Saferworld, 2005, p. 6).

This event was a dramatic illustration of how unsecured national stockpiles can have severe national and regional impacts. In Albania itself, civilians conducted much of the looting, which resulted in the widespread diffusion of illicit weapons and ammunition among the population. Further afield, an estimated 150,000 looted weapons flowed into conflicts in neighbouring regions (Khakee and Florquin, 2003, p. 25; Grillot et al., 2004, p. 18). Not only did these events indicate the physical insecurity of weapons and ammunition, but they cast a spotlight on deeper problems related to Albanian national stockpiles, including very large surpluses of ageing weapons and ammunition, the overstocking of weapons and ammunition storage depots, and the consequent risks to public safety.

In response to these concerns, from 2000 multilateral stakeholders initiated various projects to assist Albania in the reduction of its national surplus. Stakeholders included the UN Development Programme (UNDP); NATO's Maintenance and Supply Agency (NAMSA); and the Governments of the United Kingdom, United States, Norway, and Germany. To provide one such example, NAMSA's Albania II project (December 2002–October 2007) destroyed 105 million 7.62 x 39 mm, 12.7 x 108 mm, and 14.5 x114 mm cartridges; 2 million hand grenades; and 130,000 mortar rounds (Towndrow, 2010b, slide 5).

Albania had a national plan of action to destroy the entire stockpile of surplus ammunition since 2004,[63] but lacked the resources to implement it. In its Plan of Action for the Elimination of the Excess Ammunition in the Armed Forces of the Republic of Albania 2009–15, Albania commits itself to identifying and disposing of all old surplus ammunition and explosives from the Albanian

Armed Forces (AAF) inventory by 2015 (Albania, n.d.a, p. 4). In 2009 the government established the Demilitarization Steering Committee—on which NAMSA was offered a seat—chaired by the deputy defence minister to ensure the coordination of PSSM resources. The Plan of Action was reviewed and updated by the Albanian MoD's Force Modernization Team (NAMSA, 2009b, para. 4.1). NAMSA carried out a feasibility study to assess a possible follow-up project built on the success of the Albania II experience. NATO opened a NAMSA office in Tirana in September 2010 and the project began in January 2011, funded primarily by the United States (Goodyear, 2010).

NAMSA designed the Albania III project based on surplus figures provided by the Albanian MoD's J4 Directorate at the end of October 2009. The MoD declared a total ammunition stockpile of 100,000 tonnes (NAMSA, 2009a, para. 1.3). Of this amount, the AAF set aside 15,000 tonnes AUW of ammunition for its operational requirements (including training requirements until the

Table 4 Albanian MoD surplus ammunition destruction plan, 2010–13 (tonnes)*

Type of munition	Total	Industrial destruction	Destruction by OD/OB**
Rounds (7.62–14.5 mm)	16,931.6	16,931.6	0
Hand grenades & anti-tank grenades	5,558.02	0	5,558.02
RPG-2 & RPG-7 rockets	335.2	0	335.2
Rockets (107 mm, 132 mm)	1,417.2	1,417.2	0
Mortar rounds (60, 82, 120, 160 mm)	24,442.2	24,326.1	116.1
Rounds (20, 23, 25, 37, 45 mm)	1,981.05	1,950.45	30.6
Rounds (57–100 mm)	124.1	124.0	0.1
Recoilless munitions (75, 82, 107 mm)	5,169.2	3,136.1	2,033.1
Rounds (122–152 mm)	2,448.1	2,382.0	66.1
Engineering munitions (time fuses, caps)	13,763.2	2,112.0	11,651.29
Total	**72,169.9**	**52,379.45**	**19,790.51**

* Figures given as provided by the MoD.

** Open burning/open destruction.

Source: Albania (2010, slide 6)

year 2020) (Albania, 2011e, p. 2). The MoD set out to destroy the remaining 85,000 tonnes by the end of 2013, with the help of international support and funding. According to NAMSA, 9,000 tonnes were disposed of in 2009, leaving 76,116 tonnes to be demilitarized from 2010 to 2013 (NAMSA, 2009a, para. 3.1).

There are small differences between NAMSA's figures and those of the Albanian government's Plan of Action, presented below. These are possibly due to different tonnage calculations (tonnes AUW vs tonnes) and estimating techniques. The Plan of Action reports the destruction of 6,350 tonnes in 2009 and 6,423 tonnes in November 2010 (Albania, 2010, slide 3). As indicated in Table 4, the Plan of Action predicts the demilitarization of 72,170[64] tonnes of ammunition over four years from 2010 to 2013.

Table 5 Albanian MoD OB/OD destruction plan for surplus ammunition, 2010–13*

Type of ammunition	Excess		Detonation
	Pieces	Tonnes	Tonnes
Defensive & offensive hand grenades	6,167,485	5,425.3	5,425.3
Anti-tank hand grenades	78,075	132.7	132.7
RPG-2 & RPG-7 rockets	91,164	335.3	335.3
Special mortar projectiles (60, 82, 107 mm)	19,594	116.1	116.1
Special projectiles (20–45 mm) (Turkish)	39,415	30.7	30.7
Recoilless rifle ammunition (75, 82, 107 mm)	126,554	2,033.0	2,033.0
Shells with special projectiles (122, 130, 152 mm)	1,128	66.3	66.3
Total		**9,556.7**	**9,556.7**
Engineering ammunition		11,651.3	11,651.3
Total in tonnes		**19,790.7**	**19,790.7**
Projectiles collected at Gerdec & stored at Murras depot			2,030
Explosives resulting from demilitarization			3,000
Propellant charge of 122–52 mm projectiles			1,000
Total			**25,820.5**

* Figures given as provided by the MoD.

Source: Adapted from Albania (n.d.b, Table 18)

However, as Table 5 indicates, the Plan of Action also lists an additional 6,030 tonnes of munitions and explosives destined for OB/OD (Albania, n.d.b, Table 3), resulting in a total weight of 78,200 tonnes (72,170 plus 6,030 tonnes) of ammunition planned for destruction in 2010–13.

Elsewhere, the Plan of Action lists an even greater destruction target for 2010–13, foreseeing the potential destruction of 81,885 tonnes of surplus ammunition due to increased processing capacity that resulted from the combining of the UM Gramsh, KM Poliçan, and ULP Mjekës destruction facilities and OB/OD ranges (Albania, n.d.b, Table 24).

Based on the abovementioned figures reported by NAMSA and the Albanian Plan of Action, Albania's projected ammunition destruction targets for 2010–13 appear to total between 72,000 and 82,000 tons/tonnes/tonnes AUW. The Albanian MoD reports the disposal of 20,653 tonnes of ammunition in 2010 and a goal to dispose of a further 25,000 tonnes in 2011 (Albania, 2011a).

The destruction figures presented above cover ammunition listed in the Plan of Action, including the elimination of AAF surplus stockpiles, and ammunition that has been collected by the police service and handed over to the AAF. The Plan of Action does not include ammunition administered by the MoI, which is responsible for its own surplus destruction (Albania, 2011e). The AAF's J4 Directorate could not provide the Small Arms Survey with information regarding MoI surplus stockpiles or items seized or collected from civilians by the ministry.

Surplus volume

As Tables 6 and 7 indicate, at the end of 2010 Albania had designated approximately 69,000 tonnes of surplus explosive ordnance and ammunition for elimination. In mid-2011 the MoD subtracted the volume of ammunition eliminated during the first quarter of 2011 and evaluated the remaining surplus ammunition stockpile at roughly 65,000 tonnes (gross weight/AUW) (Albania, 2011e, p. 2). NAMSA reported a comparable figure in May 2011, indicating that a remaining 69,715 tonnes had been earmarked for demilitarization. These figures suggest a residual surplus stockpile of between 65,000 and 70,000 tonnes/tons AUW.

Table 6 Update on the Albanian MoD surplus ammunition destruction plan for 2011–13 as of 24 May 2011*

Factories/ranges	Total (tonnes)	Planned		
		2011	2012	2013
ULP Mjekës	26,321	8,154	8,767	9,400
KM Poliçan	22,769	6,642	7,332	8,795
UM Gramsh	1,628	900	728	
Total (demilitarization plants)	**50,718**	**15,696**	**16,827**	**18,195**
OB/OD range	14,378	8,000	6,378	
Export	4,562	2,000	1,562	1,000
Total	**69,715**	**25,696**	**24,825**	**19,195**

* Figures given as provided by the MoD.

Source: Kotobelli (2011, slide 4)

Table 7 Weapons declared surplus by the Albanian MoD, May 2011

Type of weapon	Total	Categorization		
		Donation/ sale	Museum	Scrap
Rifles & pistols (various)	221,100	220,000	1,100	0
AK-47s (various types)	35,000	35,000		0
Light machine guns	646	550	96	0
Heavy machine guns	250	250	0	0
Machine guns (12.7 mm & 14.5 mm)	1,096	1,000	0	96
Artillery guns (75–152 mm)	1,100	700	0	400
Mortars (60, 82, 107, 120, 160 mm)	900	550	0	350
Tanks	221	58	0	163
Armoured vehicles	130	0	0	130
Aircraft & helicopters	127	9	0	118
Navy ships	31	5	0	26

Source: Albania (2011a)

Table 7 shows the small arms and light weapons that the MoD declared to be surplus in May 2011.

Storage sites and conditions

In 1998 Albania reportedly operated 167 depots for the storage of small arms, light weapons, ammunition, and explosives, including major conventional systems. By 2005 the country had reduced the number of depots to 57 (Saferworld, 2005, pp. 71–72). Despite this reduction, however, the volumes of surplus contained within them remained problematic.

A 2005 assessment describes overstocking (too great a volume of ammunition) as a serious problem in several depots, such as the one located in Mirak just outside Elbasan. In this case, six warehouses contained '3,600 tonnes of different types of ammunition'. The report further states that 'there is no single site which fully conforms to the standards required for effective stockpile security and management' (Saferworld, 2005, p. ii).

The report describes how sites contained mixed packages of loose ammunition, which were not stored according to hazard type. Large quantities of old ammunition, lacking stabilizers, had been moved around the country to accommodate the downsizing of the depots. The proximity of neighbouring residential buildings was a public-safety concern. Depot security was also an issue, because the AAF had not invested in effective security measures such as intruder alarm systems or video surveillance systems in the depots that were designated for closure. 'The main security measures against theft', the report notes, 'were restricted to poorly paid conscripts, barbed wire, padlocks for wooden doors, barred windows and occasional exterior lighting' (Saferworld, 2005, pp. 71–72).

In March 2008 a major explosion at an ammunition depot near the village of Gërdec killed 26 people, injured more than 300, and necessitated a costly clean-up operation. A UN disaster assessment reported that approximately 26 sites around Albania contained an estimated 100,000 tones of obsolete or surplus ammunition. According to the assessment, 91 per cent of this ammunition dated from the 1970s or earlier, with most of it dating back to the Second World War. The estimated cost of decommissioning this ammunition was calculated at USD 77.8 million in 2008 (UNDAC, 2008, p. 9).

By 2009 the AAF had reduced the number of ammunition storage depots to 48, which included 223 storehouses. NAMSA (2009a, para. 1.4) reports that most of the depots were 'in poor condition and close to built-up areas', and describes some of the ammunition as 'old and beyond its safe life'. The Albanian Plan of Action notes that excess ammunition was stored in the same depots as operational stocks. It also notes that depots

> *. . . do not have the complete infrastructure, they are not licensed according to safety and security standards, and the ammunition is [not] being stored according [to] the storage plan, but because of the lack of empty spaces the munitions has been stored by utilizing the surface and the volume at maximum* (Albania, n.d.b, p. 1).

As of May 2011 the AAF operates 26 ammunition storage sites. Of these, it uses 23 depots to store surplus ammunition and three depots to house AAF operational and reserve ammunition (Albania, 2011e, p. 4). The AAF closed six ammunition storage sites in 2010 and plans to close an additional five in 2011 (Albania, 2011b).

Following the total elimination of the surplus stockpile, the AAF foresees using three 'grouped' depots to store its operational ammunition requirements after 2015 and two WSSs. It notes that it will make investments to improve infrastructure in these facilities (Albania, 2011e, p. 3). According to NAMSA, the AAF plans to consolidate national ammunition storage into three or four primary NATO-compliant storage depots (NAMSA, 2009b, para. 1.3).

In addition to designated storage depots, a significant amount of ordnance awaiting disposal is continually stored in the country's three main demilitarization plants. According to Annex D of NAMSA's 2009 proposal, ULP Mjekës consists of administrative buildings; 11 former production lines for high explosives, propellants, and associated chemicals; and two storage areas. For this reason, NAMSA's Albania III project foresees the refurbishment of four ammunition depots in ULP Mjekës (Towndrow, 2010a, slide 14).

Surplus value

The following sections consider the current and future options available to Albania for recouping funds from the sale, donation, or recycling of surplus weapons and ammunition.

Sales

Albania (2011c) considers three ways in which the selling of surplus ordnance might generate funds. These are:

- sales for militarily use (i.e. to a foreign military buyer);
- sales to museums and civilian collectors; and
- sales of scrap component parts (i.e. metal and chemical elements).

The Plan of Action identifies sale or donation as one of the five methods of surplus disposal (Albania, n.d.a, p. 8). Albania's MoD decides whether the surplus is destroyed or sold, following an assessment of the risk a surplus represents due to its physical condition and proximity to populated areas (Albania, n.d.a, p. 16).

According to figures published by the MoD-operated company MEICO, Albania sold USD 3,258,917 worth of small arms and light weapons between 2000 and 2004 (Saferworld, 2005, p. 37). The company reportedly keeps a percentage of the proceeds from sales, while the remaining profit goes to the Government of Albania (SEESAC and BICC, 2003, p. 23). Albania's arms transfer regime remains opaque, but anecdotal open-source accounts tend to confirm its presence in the global surplus market, as the following examples suggest:

- In March 2008 the *New York Times* exposed a USD 300 million procurement contract involving the US-based company AEY and tens of millions of surplus, 40-year-old, Chinese-manufactured 7.62 x 39 mm cartridges sourced from Albanian stockpiles. The Albanian government reportedly received USD 22 per 1,000 rounds of the ageing ammunition (Chivers, 2008).
- Gobinet and Gramizzi (2011) detail five export licences granted for re-exports to Burundi in 2009 by Montenegrin authorities. This involved the transfer of 12.7 x 108 mm ammunition and small arms (via brokering agents operating from Cyprus) from Albania (Montenegro, 2010b, pp. 24, 33, 37, 42, 47). Data submitted by Albania to the UN Register of Conventional Arms for 2009 partially captures these transfers and explicitly refers to the export of ammunition (UNROCA, n.d.).

In its reply to the Small Arms Survey PSSM questionnaire, the Albanian MoD explained that it was unable to provide information on the sale value of

its surplus stockpiles because the potential sale value 'depends on the level of demand and offer'. It did not provide the Small Arms Survey with unit prices of surplus weapons or ammunition that had already been sold by the Albanian authorities. According to the MoD, 'their sale is one of the alternative options, because the main alternative remains their elimination (destruction)' (Albania, 2011e, p. 3).

NAMSA figures indicate that Albania has earmarked approximately 7 per cent (4,562 tonnes) of its surplus ammunition stockpile for export in 2011–13 (Kotobelli, 2011, slide 4).

Donation

In 2002 Albania donated 600 assault rifles and an unknown number of machine guns to Afghanistan (Saferworld, 2005, p. 37). In the same year, Albania is reported to have sent 10,000 rounds of ammunition to equip the Afghan military, while in 2004 and 2005 it transferred several million cartridges to Iraqi security forces (Saferworld, 2005, p. 80). Approximately 200 tonnes of ammunition and 10,000 weapon pieces were donated in 2009 and 2010; their value was not estimated (Albania, 2011e, p. 3).

Recycling

In 2009 NAMSA proposed that the Albanian MoD

> *. . . provide a mechanism whereby income generated from the sale of by-products and scrap is returned to a special MoD demilitarization fund that will assist in providing the resources for the Albanian contribution to the project* (NAMSA, 2009a, para. 7.1.4).

In other words, Albania was to part-finance the disposal of surplus via the sale of scrap components derived from demilitarized weapons and ammunition.

The industrial demilitarization of the AAF's surplus ammunition at the KM Poliçan, ULP Mjekës, and UM Gramsh sites involves recycling, repackaging, and storing explosive residue (such as amatol and TNT). These explosives are intended for local factories that produce civil-use explosives such as ammonite (a derivative of amatol) and dynamite.

The MoD reports that funds recovered from the sale of scrap components or explosive residue will flow to the Government of Albania (90 per cent to the MoD and 10 per cent to the Ministry of Finance) and will be reallocated to other demilitarization projects.[65] The MoD reports that it uses approximately 90 per cent of the income generated from the sale of by-products and scrap from its R3 activities to offset demilitarization/destruction costs (Albania, 2011e, p. 3).

The MoD reports further that it has obtained approximately 20,000 tonnes of scrap metal (including steel, aluminium, copper, and iron) from demilitarized surplus conventional ordnance, which will be sold by public tender. According to the Plan of Action, the MoD also expects to obtain approximately 3,000 tonnes of explosive material for potential resale for civilian purposes or destruction in 2013 (Albania, 2011e, p. 6).

At the ULP Mjekës site, for instance, the government plans to demilitarize approximately 31,336 tonnes (gross weight) of surplus AAF ammunition industrially.[66] It estimates that this will yield the following outputs (Albania, n.d.b., para. 4.1.2A):

- The demilitarization of 12,265 tonnes of 160 mm and 120 mm mortar rounds (between February 2010 and December 2013) is expected to yield 786–1,400 tonnes of explosive residue and 216 tonnes of propellant.
- The demilitarization of 7,127 tonnes of 75–152 mm artillery rounds (between January 2011 and December 2013) is expected to yield 417 tonnes of explosive residue and 519 tonnes of propellant.
- The demilitarization of 2,112 tonnes of land mines (between July 2010 and December 2012) is expected to yield 893 tonnes of explosive residue.

Overall, the MoD reports that it sold 'nearly 2,300 tonnes of ammunition and explosive ordnances that were obtained from the industrial dismantling of ammunition' in 2009 and 2010 (Albania, 2011e, p. 3). Yet according to the MoD (Albania, 2011b), this figure also represents the amount of surplus ammunition exported in 2010. It is therefore not clear whether the 2,300-tonne figure represents ammunition that has been sold intact as surplus or sold after being processed and recycled.

Estimated cost to the defence budget

The following sections address the costs of managing surplus weapons and ammunition stockpiles to Albania's defence budget. These burdens include activities related to the maintenance of storage infrastructure (including ensuring the safety and security of stockpiles and the relocation of ammunition from one site to another); the allocation of personnel to ensure the safe and secure storage, handling, transportation, and accounting of surplus stockpiles; and the costs incurred in demilitarizing or destroying surpluses.

Storage costs

The reduction in the number of ammunition storage facilities (from 167 in 1998 to 26 in 2011) imposes costs on the defence budget. A cost-benefit assessment of this initiative suggests that Albania stands to dramatically reduce its weapons and ammunition storage costs in the long term. In the short term, however, the assessment, transport, and restocking of depots are likely to have proved a costly enterprise. Ammunition transportation costs in support of NAMSA's Albania III project alone were initially estimated at EUR 3.8 million (USD 5.2 million), or EUR 50 (USD 68) per tonne[67] (NAMSA, 2009a, p. 10).

In addition, Albania's plan to consolidate storage sites and create new facilities in line with NATO storage and security standards is likely to place additional burdens on the country's defence budget.

Personnel costs

The costs in terms of personnel and their coordination should not be ignored in any calculation of the cost that Albania's surplus stockpile imposes on its defence budget. The management of surplus weapons and ammunition necessitates expenditure in departments that either manage, or have been created explicitly to manage, surplus stockpiles.

For example, the MoD's Directorate for the Management of Properties and Excess Materials controls surplus stockpiles, identifies locations and disposal priorities, issues executive orders to move items from stores to various disposal sites, and provides a single source of authoritative figures by developing and maintaining a master accounting spreadsheet. J4 of the main headquarters and the Logistics Brigade ensure that sufficient resources are available to

coordinate the logistic requirements and that the AAF maintains the efficient delivery of ammunition to disposal sites.

The Logistics Brigade, staffed by 652 people, is responsible for the maintenance and administration of the 26 MoD weapons and ammunition depots. A total of 1,472 people, representing approximately 12.5 per cent of the overall military personnel of the AAF,[68] are assigned to guarding depots (Albania, 2011e, p. 4). This figure is lower than previous assumptions, which estimated that 25 per cent of AAF soldiers are engaged in securing depots (Lazarevic, 2010, p. 6). Nevertheless, this represents a considerable personnel commitment—much of it devoted to securing surplus stockpiles.

Demilitarization costs

NAMSA's Albania III project initially forecast that the cost of ordnance demilitarization would amount to EUR 35.8 million (USD 49.7 million) for a four-year project (Towndrow, 2010a, slide 10). In May 2011 NAMSA reforecast the cost of the programme, valuing it at EUR 36.8 million (USD 51 million) for the same period (Kotobelli, 2011, slide 12). These figures include international donations and Albanian contributions.

Albania contributes to the programme in a number of ways, including:

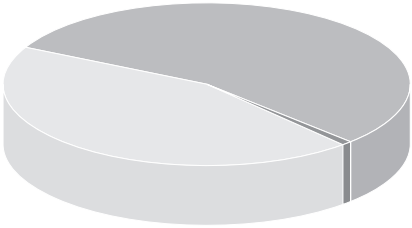
1. selecting and recording the details of ammunition to be demilitarized;
2. inspecting, repacking, and loading ammunition at the storage sites;
3. transporting the ammunition from the storage sites to the demilitarization facilities and the OB/OD sites;
4. destroying by OB/OD a maximum of 23,432 tonnes of ammunition;
5. providing offices and facilities for NAMSA's in-country management team at Tirana and at the industrial demilitarization facilities;
6. coordinating and arranging local procedures, import formalities, security and safety precautions, and other related issues; and
7. providing logistic support for NAMSA's in-country management team.

During the four years of the project, these activities imposed measurable costs on the Albanian defence budget, including: (1) ammunition transportation costs, estimated at EUR 3.8 million (USD 5.2 million), or EUR 50 (USD 68) per tonne;[69] (2) AAF resources for OB/OD, estimated at EUR 4.7 million (USD 6.4 million), or

EUR 200 (USD 274) per tonne;[70] and (3) activities related to the support of the NAMSA in-country management team, estimated at EUR 80,000 (USD 110,000) (NAMSA, 2009a, para. 5.3).

Albania's total contribution can be estimated at around EUR 8.5 million (USD 11.6 million) (Towndrow, 2010a, slide 11). This figure would reportedly fall by EUR 3 million (USD 4.1 million) if the maximum possible quantity of ammunition were demilitarized by industrial processes rather than OB/OD (NAMSA, 2009a, para. 5.4).

Figure 1 Repartition of the Albanian contribution to the Albania III project



Source: Towndrow (2010a, slide 11)

Each year the Albanian government sets aside EUR 3–4 million (USD 3.8–5 million) to cover the costs of destruction (elimination). This figure does not include international donor funding from the US State Department and NAMSA. In 2010 the Albanian government spent approximately EUR 3 million (USD 4.3 million) on destroying ammunition and expects to spend approximately EUR 3.5 million (USD 4.9 million) in 2011 (Albania, 2011e, p. 5).

Priorities for destruction

Albania asserts that it gives full priority to the Plan of Action. It also indicates that, in addition to the timeframes outlined in the Plan of Action, it has prioritized the destruction of 25,000 tonnes of highly unstable ammunition (Albania, 2011b).

Bosnia and Herzegovina

Background

Bosnia and Herzegovina (BiH) is the only RASR participating country not to have responded to the Small Arms Survey PSSM questionnaire. The figures presented in this section are therefore either based on previous reporting by BiH or have been supplied by other stakeholders, including NATO and the Expert Working Group (EWG) consisting of representatives from a number of organizations involved in arms control activities in BiH.

The first estimates of the operational requirements of the Armed Forces of BiH (AF BiH) for small arms and ammunition appeared in 2003.[71] These estimates were compiled at a time when the restructuring and downsizing of the AF BiH were under way. The creation of the BiH Defence Reform Commission added momentum to the downsizing process of AF BiH sites and paved the way for BiH's entry into NATO's Partnership for Peace (Nichols, 2006, p. 5).

In 2003 NATO's Stabilization Force (SFOR) in BiH suggested that the future BiH army should be limited to 12,000 soldiers, with operational requirements for 12,000 5.56 x 45 mm assault rifles and 240 7.62 x 51 mm machine guns (CSS, 2003, p. 44). At this stage, BiH military forces were split between two regions or 'entities': the Federation of Bosnia and Herzegovina and the Republika Srpska.

By January 2006 the State Law on Defence had formalized defence reforms and downsized the AF BiH to 10,000 soldiers. The two military forces in the country—the Federation Army (VF) and the Army of the Republika Srpska (VRS)—were merged into a unified BiH force under a single MoD (UNDP, 2007, p. 1).

In 2009 BiH had an estimated surplus stockpile of 25,000 tonnes of ammunition and 100,000 small arms and light weapons (SEESAC, 2009, slide 4). On 10 June 2009 the BiH Presidency issued a decision that planned for the disposal of approximately 95,000 surplus weapons and 24,000 tonnes of surplus ammunition. On 10 April 2010 the Presidency announced that it would destroy these weapons, in addition to 4,000 tonnes of 'high-risk' ammunition (OSCE, 2010).

Table 8 AF BiH weapons and ammunition requirements and surpluses, provided by BiH MoD as of November 2010

	Heavy armament	Small arms and light weapons*	Ammunition
AF BiH stockpiles	3,735 pieces	89,625 pieces	≈ 30,000 tonnes
AF BiH requirements**	396 pieces	23,747 pieces	7,500 tonnes
AF BiH surpluses***	3,339 pieces	65,878 pieces	≈ 22,500 tonnes (including ≈ 4,500 tonnes already identified as unsafe)

* On 14 June 2010 the BiH authorities decided to adopt the OSCE definition of small arms and light weapons.
** According to the AF BiH new structure and the Book of Formations and Material.
*** Decision of the BiH Presidency of 10 June 2009.

Source: EWG (2010b, slide 5)

In November 2010 the EWG released the figures given in Table 8, which list AF BiH stockpiles of weapons and ammunition, its operational requirements, and surplus ordnance.

BiH has ambitions to become a member of NATO and the EU. In April 2010 NATO foreign ministers agreed to grant BiH's participation in a NATO Membership Action Plan (VOA, 2010). Yet due to rising political tensions, BiH has failed to form a state-level government since the October 2010 general elections.

Problems related to the development of a centralized government administration have had a deleterious impact on BiH's ability to define and organize its PSSM process. A number of decisions are taken and directives issued at the Presidency and MoD levels to address the surplus issue (BiH, 2011c). However, the country's current constitutional setup, the restructuring and downsizing of the AF BiH, and the (uneven and confused) transfer of previously 'entity' (VF and VRS) responsibilities to centralized government clearly impede the MoD's capacity to plan surplus destruction programmes efficiently. A lack of clarity regarding the responsibilities of the entities and central government may also explain why BiH's MoD did not respond to the Small Arms Survey PSSM questionnaire.

Surplus volume

In May 2011 the BiH MoD declared that its stockpiles included ammunition, mines, and explosives totalling 28,889 tonnes; ASSs that it planned to retain in the long term (often called 'prospective' or *perspectiv* sites) containing 7,500 tonnes of ammunition; and a surplus ammunition stockpile of 21,389 tonnes. The latter reportedly includes approximately 4,500 tonnes of highly unstable ordnance earmarked for immediate destruction (Peric, 2011).

A BiH MoD report of 29 May 2011 is reflected in Table 9. It indicates that the sites that BiH plans to retain in the long term ('prospective' or *perspectiv* sites) contain an estimated 12,557 tonnes of ammunition. Sites planned for future decommissioning ('non-prospective' or *unperspectiv* sites) contain an estimated 15,998 tonnes of ammunition. Temporary, transitional (*tranzition*) sites contain 645 tonnes of ammunition. The total volume of ammunition amounts to 29,200 tonnes. Of this figure, 7,500 tonnes are planned for retention ('prospective') and 21,700 tonnes are surplus destined for disposal ('non-prospective').

In addition to the ammunition listed in Table 9, in 2010 the BiH MoD reported a small arms and light weapons stockpile of 124,025 pieces. Of this stockpile, it plans to retain 24,143 pieces ('prospective') and has declared 99,882 pieces as surplus. Of these surplus pieces, 30,081 are scheduled for destruction, 579 for donation, and 1,687 for sales contracts (BiH, 2011b).

Table 9 Quantities of surplus and prospective ammunition in BiH storage sites, May 2011

	No. of sites	Ammunition in tonnes (gross weight)
Non-prospective ASSs	12	15,998
Prospective ASSs	5	12,557
Transitional ASSs	3	645
Prospective ammunition		7,500
Surplus ammunition		21,700
Total	**20**	**29,200**

Source: BiH (2011b)

Table 10 AF BiH stockpiles of weapons and ammunition according to NATO, May 2011

	Heavy armaments	Small arms and light weapons	Ammunition
AF BiH stockpiles	3,700 pieces	76,000 pieces	Approx. 30,000 tonnes
AF BiH surpluses	3,300 pieces	53,000 pieces	Approx. 21,000 tonnes

Source: Bauer (2011)

Figures provided by NATO in May 2011 are similar to those provided by BiH for its stockpiles of surplus ammunition (21,700 and 21,000 tonnes, respectively). Figures for the 'total stockpile' to 'surplus' ratio of small arms and light weapons, however, differ considerably from those reported by the BiH MoD. Of the total small arms and light weapons stockpile (reported by BiH as 124,000 and NATO as 76,000), BiH reports an 80 per cent surplus, while NATO (see Table 10) reports a 70 per cent surplus of 53,000 pieces. It is unclear why these small arms and light weapons totals differ, particularly given that there is little variation between BiH and NATO estimates of ammunition operational needs (approximately 24,000 pieces).

Storage sites and conditions

In 2004 there were between 38 and 47 major ammunition storage sites in BiH, under the control of the entity armed forces (VF and VRS). The Office of the High Representative in BiH called for a reduction in the number of storage sites to six facilities. A UNDP feasibility study determined that this consolidation was unworkable, since it would 'significantly increase the already excessive Net Explosive Content . . . of these sites, and therefore increase risks' (Threat Resolution Ltd, 2004, p. 2). The study assessed the six storage sites that were intended to remain in use, which included four VF sites (Tuzla, N/B/075; Gabela, E/F/007; Grabež, W/B/053, and Pazaric Krupa, E/F/024) and two VRS sites (Rudo, E/V/076 and Kula I & II, W/V/096). It reported that, with the exception of two sites (Tuzla, N/B/075 and Grabež, W/B/053), most of the sites

presented significant security and safety risks, including the following (Threat Resolution Ltd., 2004, p. 35):

- The buildings in which the ammunition was stored suffered from significant structural damage. They did not have explosive limit licences, and storage limits were governed only by the physical capacity of each store.
- The majority of the ammunition was of Yugoslav or Russian origin and dated from the last 20 years. In addition, much of the ammunition was manufactured in a number of countries, including the former Soviet Union, China, Romania, and Yugoslavia; virtually no technical data was available; and the VF had no means of identifying ammunition at risk from propellant instability.
- Ammunition was not stored according to hazard division and compatibility group.
- The sites were overstocked far in excess of the net explosives quantity due to the closure of smaller sites.
- Large quantities of ammunition were left unpackaged, stored in the open or in temporary facilities, and often in close proximity to the explosive storehouses' doors.
- Leaking containers of unidentified chemicals, possibly a liquid propellant oxidizer, were stored alongside other explosives.
- Fire-fighting equipment was inadequate or out of date at all locations.
- There were no records of inspections having been conducted or the existence of an ammunition surveillance system.
- Perimeter security at storage sites was described as 'cursory', with inappropriate personnel, inactive intruder detection systems, and insufficient internal and external lighting.

By November 2010 BiH had reduced the number of ammunition storage sites to five long-term 'prospective' facilities, 13 'non-prospective' facilities scheduled for future decommissioning, and three sites operating as temporary storage facilities.

However, in 2010 the EWG highlighted the fact that none of these sites would satisfy international safety and security standards without significant investment. It noted that BiH's ammunition storage sites were overloaded and any

Table 11 BiH: planned ASS closures, 2011–16

ASS	Depot closure timeline
Gabela	3–5 years
Kula I & II	
Krupa	
Grabež	
Kozlovac	
Kosova	2011
Draga	
Uzamnica	
Ljuta	
J. Potok	2012
B. Greda	
Bačevići	2013
Krčmari	
Blažuji	2014
Duži	
Rudo	2015–16
Daljani	

Source: Bauer (2011)

attempt to decrease the number of surplus storage sites would only worsen the situation (EWG, 2010b, slides 10, 11).

Most of the EWG's findings remained valid in May 2011. In 2011 a BiH MoD representative highlighted the fact that the regrouping of ammunition from 'non-prospective' sites to 'prospective' depots was problematic in terms of storage space, transport costs, risks, and the availability of trained personnel (BiH, 2011b).

In 2009–10 BiH closed four 'non-prospective' ASSs: Brizjak Vitez; Čizma Kiseljak, Tatarbudjak Žepče, and Ljubače Živinice. As Table 11 indicates, depot closures are scheduled until 2016.

The BiH MoD indicates that 12 'non-prospective' sites (scheduled for decommissioning) currently store 15,998 tonnes (AUW) of ammunition.

BiH's ultimate goal is to reduce the number of storage sites to two prospective WSSs (N/V/039 Rabić in Derventa and N/B/187 T. T. Buza in Visoko) (Bauer, 2011) and to retain five prospective ammunition depots, which currently stockpile more than 12,000 tonnes (gross weight) of ammunition.

BiH's current priority is to conduct technical inspections of all five prospective ASSs. According to BiH, these sites partially meet NATO standards in a variety of areas, but fail to meet NATO standards due in part to a lack of supervision and the lighting of the facilities (BiH, 2011b). According to the BiH MoD,

Table 12 BiH: non-prospective ASSs

Code	Name	Location	Qty ammunition (tonnes net weight)	Qty ammunition (tonnes gross weight)
E/B/041	Kosova	Goražd	130	194
E/B/076	Ljuta	Konjić	33	49
E/H/346	Bačevići	Mostar	520	731
E/V/032	J. Potok	Pale	562	828
E/V/068	Uzamnica	Višegrad	756	1,039
E/V/076	Car Dušan	Rudo	1,630	2,335
E/V/329	Duži	Trebinje	1,325	1,875
W/B/007	Daljani	D. Vakuf	1,450	2,035
W/H/250	Draga	Busovača	985	1,270
W/V/086	Krčmari	Banja Luka	2,157	3,105
N/H/029A	B. Greda	Orašje	590	858
E/F/003	Blažuji	Sarajevo	1,475	1,680
Total			**11,611**	**15,998**

Source: BiH (2011b)

Table 13 BiH: prospective ASSs

Code	Name	Location	Qty ammunition (tonnes net weight)	Qty ammunition (tonnes gross weight)
E/F/007	Gabela	Čapljina	2,216	2,920
E/F/024	Krupa	Sarajevo/ Hadjići	1,587	2,115
W/B/053	Grabež	Bihać	974	1,166
W/V/096A	Kula 1	Mrkonjić Grad	925	1,181
W/V/261	Kula 2		1,833	2,409
N/B/075A	Kozlovac	Tuzla	2,510	2,766
Total			**9,945**	**12,557**

Source: BiH (2011b)

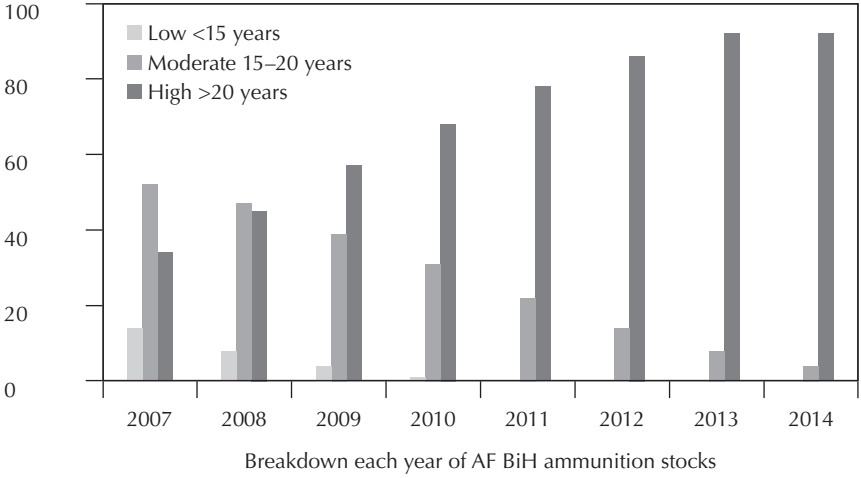
the five prospective sites comprise a total of 92 storage buildings, of which 43 buildings fail to meet NATO safety and security standards.

The storage depot of the GOF-18/Trom demilitarization facility, located in Doboj, is the only one to comply fully with NATO standards (BiH, 2011b).

Analysis of AF BiH ammunition stocks, by age and according to the US DTRA risk categories, suggests serious risks. The EWG reports that BiH does not

Figure 2 Age analysis of AF BiH ammunition stocks, 2007–14

% each year in DTRA risk category



Source: EWG (2010b, slide 6)

Table 14 BiH: condition of storage buildings in the five prospective ASSs

Prospective ASS	Number of storage buildings	Not standardized (NATO)
Kula	36	0
Kozlovac	16	7
Grabež	6	6
Krupa	21	17
Gabela	13	13
Total	**92**	**43**

Source: BiH (2011b)

stockpile any 'low-risk' ammunition; that 22 per cent of its ammunition can be classified as 'moderate risk'; and that by 2013–14 more than 90 per cent of the country's ammunition is expected to be classified as 'high risk' (see Figure 2).

Surplus value

The following sections consider current and future options available to BiH for recouping funds from the sale, donation, or recycling of surplus weapons and ammunition.

Sales

AF BIH surplus weapons and munitions remain the property of the entities. Revenue from related sales and recycling have been a bone of contention since the so-called Doboj Agreement of 2008.[72] The process for the issuance of arms export permits currently involves the participation of at least four ministries.[73]

BiH authorities do not have the capacity to test and certify ammunition as 'safe to move' for export purposes or to verify and control the final destination of exported surplus ordnance. In many cases, the storage provenance of small arms ammunition is not known and samples cannot be statistically representative. As a result, the AF BiH Technical Inspection Team has increasingly condemned as 'unsafe' quantities of small arms ammunition that have been offered for sale and export.

According to an EWG report, by March 2010 'the best and safest' of BiH's surplus ammunition had already been sold. The EWG estimates that the export price of BiH ammunition suffered considerably from this. It calculates that in 2010, 7,000 tonnes of BiH small arms surplus ammunition would command a price[74] of only BAM 3.85 million (USD 2.7 million in 2010). In order to address the issue of potential exports of unsafe or inferior-quality ammunition, the EWG encourages the BiH Presidency (1) to establish a maximum 18-month deadline for sales/shipments of surplus weapons and ammunition, and (2) to authorize the MoD to destroy surplus ammunition (regardless of its having been earmarked for sale) without the need for additional approval by the Presidency (EWG, 2010a).

Despite these reservations, numerous reports detail BiH exports of surplus weapons and ammunition in recent years. Between January 2006 and March 2011 BiH disposed of 10,831 tonnes of surplus ammunition, mines, and explosives; of this, 2,152 tonnes of surplus were reportedly sold (Peric, 2011).

According to EUFOR (2011), the Ministry of Foreign Trade and Economic Relations did not issue or implement any export licences in 2008 or 2009, including to countries under UN arms embargo.[75] Exports resumed in 2010 with Federation and Republika Srpska defence companies exporting military assets from AF BIH surplus stockpiles, including small arms ammunition and mortar shells to Yemen (EUFOR, 2011). In June 2010, for instance, AF BiH's declared 20,000–25,000 tonnes as surplus,[76] including 4,000 tonnes of ammunition that were reportedly earmarked for sale by five pending export contracts. These contracts were reportedly concluded before the July 2004 moratorium on the sale of small arms and ammunition by the entities' MoDs.[77] The BiH Presidency recently lifted the moratorium and previous sales contracted prior to the moratorium were allowed to proceed in 2010.

NATO estimates that BiH sold 1,300 tonnes of ammunition in 2010 and projects the sale of 4,000 tonnes in 2011 (Bauer, 2011)). The BiH MoD reports the export in 2010 of 1,754 tonnes of surplus ammunition and 5.7 tonnes of surplus weapons[78] (EUFOR, 2011). A May 2011 presentation by BiH MoD officials to the Regional Arms Control Verification and Implementation Assistance Centre (RACVIAC) conference in Pula, Croatia, suggests that BiH sold 1,883 tonnes of surplus ammunition in 2010 *alone* (BiH, 2011b).

On 17 March 2011 the BiH Presidency temporarily banned arms exports following a warning by the BiH Intelligence and Security Agency and information from diplomatic sources regarding the possible export of arms from BiH in contravention of UN resolutions and other international treaties (BiH, 2011a). The Presidency lifted the ban in May 2011 and the BiH Council of Ministers amended arms export regulations to give the Intelligence and Security Agency more control over arms export decisions. In the first half of 2011 AF BiH Joint Staff reported the provision of 669.7 tonnes of ammunition to buyers. This implies that at the time of writing some of the ammunition was still in BiH awaiting shipment (EUFOR, 2011).

Donation

In 2011 the US Embassy and NATO Headquarters in Sarajevo arranged for the donation by BiH of 60 refurbished 122 mm D-30 howitzers to the Afghan National Army (Allied JFC Naples, 2011; Bauer, 2011; BiH, 2011b).

Recycling

BiH is unable to sell scrap components resulting from the demilitarization of weapons and ammunition because these items are the property of the entities rather than of the central government (BiH, 2011c). Despite this, it is clear that demilitarization processes produce certain quantities of scrap. Although Table 15 (provided by the BiH MoD) indicates neither a timescale nor the original quantities of surplus ammunition involved, it indicates the production of around 860 tonnes of scrap metal and explosives at the GOF-18 demilitari-

Table 15 BiH: quantities (in kilograms) of scrap material and explosives obtained from demilitarization activities at the GOF-18 Doboj plant (timescale and original quantities of destroyed surplus ammunition unknown)

Scrap material	Republika Srpska	Federation	Operation Harvest (SFOR & EUFOR*)	Total
Brass	69,473	116,590	-	186,063
Contaminated (lesser-quality) brass	16,970	45,781	1,640	64,391
Sheet iron <3mm	37,092	45,706	2,052	84,850
Sheet iron >3mm	36,792	39,791	261	76,844
Iron casting	145,692	290,720	-	436,412
TNT	11,093.6	746.6	-	11,840.2
Pentrite PETN	2.5	-	-	2.5
Hal-20 explosive**	9.3	-	-	9.3
Total	**317,124**	**539,335**	**3,953**	**860,412**

* EU Force.

** Possibly an explosive containing aluminium such as hexal or hexotonal

Source: BiH (2011b)

zation site. Ownership of these products is split between the former VF (539 tonnes) and VRS (317 tonnes).

Estimated cost to the defence budget

The following sections address the costs of managing surplus weapons and ammunition stockpiles to BiH's defence budget. Where precise figures are unavailable, the text uses a variety of information to illustrate burdens on the defence budget that result from the retention and management of surplus stockpiles. These burdens include activities related to the maintenance of storage infrastructure (including ensuring the safety and security of stockpiles and the relocation of ammunition from one site to another); the allocation of personnel to ensure the safe and secure storage, handling, transportation, and accounting of surplus stockpiles; and the costs incurred in demilitarizing or destroying surpluses.

Storage costs

NATO statistics indicate that in 2003 the annual cost of ammunition storage in BiH, applying proper standards of security and maintenance, ranged between USD 70 and USD 833 per cubic metre (Paes, Risser, and Pietz, 2004, p. 16). If these figures are accurate, the costs of storage can be expected to have increased between 2003 and 2011.

A rough estimate would suggest that, if BiH surplus ammunition stockpiles of 21,000 tonnes equated to 21,000 cubic metres, annual costs of storage could range from USD 1.5 million to USD 17.5 million at 2003 prices.

Personnel costs

In 2006 a UN Institute for Disarmament Research team visited three storage sites in Visoko, Jahorinski Potok, and Kiseljak. The team concluded that 'the costs involved in running these depots appeared to be minimal as they are not up to NATO standard'. The team also noted the generally low salaries of the staff at the depots (Turner, 2006, pp. 16–17).[79] However, despite minimal storage standards, low salaries, and the erstwhile use of conscripts[80] to guard facilities, BiH's storage facilities incur relatively high maintenance and surveillance costs.[81]

Table 16 Personnel, salaries, and maintenance costs for BiH ASSs (BAM)

Site name	City	Utilities	Support	Salaries	Maintenance	Personnel	Subtotal
Gabela	Capljina	17,556	43,800	106,800	99,000	12	267,156
Krupa	Hadjići	17,280	43,800	106,800	135,000	12	302,880
Grabež	Bihac	16,127	43,800	106,800		12	166,727
Kula 1 & 2	Mrkonjić	27,621	54,750	132,000	150,000	15	364,371
Kozlovac	Tuzla	6,418	43,800	106,800		12	157,018
Rabic	Derventa	7,218	65,700	106,800		18	179,718
Teufik Buza	Visoko	26,380	43,800	106,800	25,000	12	201,980
3. Maj	Doboj	59,780	43,800	106,800		12	210,380
Ljuta	Konjic	44,614	43,800	106,800		12	195,214
Bačevići	Mostar	25,042	43,800	106,800		12	175,642
J. Potok	Pale	12,902	43,800	106,800		12	163,502
Uzamnica	Visegrad	6,913	43,800	106,800		12	157,513
Car Dušan	Rudo	12,842	43,800	106,800		12	163,442
Duži	Trebinje	30,610	51,100	123,600		14	205,310
Ljubaca	Zivinice	35,978	43,800	106,800		12	186,578
Daljani	Donji Vakuf	15,884	69,350	165,600		19	250,834
Draga	Busovaća	10,216	62,050	148,800		17	221,066
Krćmari	Banja Luka	5,011	62,050	148,800		17	215,861
Blažuj	Sarajevo	40,930	29,200	73,200		8	143,330
Mato Lucic	Kiseljak	110,951	43,800	106,800		12	261,551
Glanda Brba	Glamoc	0	51,100	124,600		14	175,700
Livada	Foca	4,558	18,250	44,500		5	67,308
Matrez	Visoko	9,012	18,250	44,500		5	71,762
Total		**543,843**	**1,051,200**	**2,500,800**	**409,000**	**288**	**4,504,843**

Source: Bauer (2011)

BiH's defence budget is approximately EUR 200 million (USD 289 million). It reportedly spends around 5 per cent of this figure (USD 14.4 million) on safekeeping and safeguarding weapons and ammunition storage depots.[82]

These costs can be broken down in a number of ways. According to UNDP, it costs the BiH MoD approximately EUR 10,000 (USD 14,500) each month to safeguard a storage site. With 20 ammunition storage sites, this equates to around USD 290,000 per month, or USD 3.5 million annually spent on ammunition storage sites alone. The BiH MoD reportedly assigns approximately 800 soldiers to guard these sites (BiH, 2011c).[83] This figure conflicts with the data provided in Table 16.[84]

RACVIAC estimates that the annual personnel cost of guarding locations with surplus, 'non-prospective' weapons and ammunition at approximately EUR 1 million (USD 1.45 million) (BiH, 2011c; RACVIAC, 2011). Table 16, which details personnel, salaries, and maintenance costs for each of the ammunition depots as of May 2011, suggests an even larger expense for the support, salaries, and maintenance of 'non-prospective' ammunition sites of more than BAM 3 million (USD 2.2 million).

Demilitarization

BiH did not respond to the Small Arms Survey PSSM questionnaire; it is therefore difficult to assess the extent of the Bosnian government's direct financial contribution to the demilitarization process—if any. Workshop discussions indicate that the country is entirely reliant on UNDP, NATO, EUFOR, the OSCE, and the US Embassy to provide financial, technical, training, and policy support to the government's arms control and demilitarization initiatives. Problems related to the development of a centralized government administration thwart BiH's willingness and ability to dedicate funds to its PSSM process: a forthcoming *Special Report* on SEE demilitarization infrastructure highlights that BiH does not use its full demilitarization capacity.

Priorities for destruction

In March 2010 the EWG prioritized a number of degraded, damaged, poorly secured, or highly sensitive items for immediate destruction on the grounds

that they posed the greatest risks in terms of unplanned explosions or proliferation (EWG, 2010a):

- 25,000 M16A1 automatic rifles;
- 10 free-flight rockets 'LUNA' (NATO FROG-7);
- 74,720 KB-1 cluster munitions;
- 321 BL 755 cluster bombs;
- 56 'ORKAN' missiles (144 KB-1 sub-munitions in each warhead);
- 24 ground-launched weapons RFAB 275/4;
- 34 fuel air bombs FAB 275;
- 20,000 pieces of various calibres containing white phosphorous;
- 8,000 propellant charges (155 mm);
- 52 mortar shells (cluster munitions) (120 mm);
- 94 multiple-launch rocket system (MLRS) rockets (128 mm);
- 2,868 air-to-ground missiles (57 mm); and
- 1,370 air bombs of various types.

It is not clear how many of these items had been destroyed as of May 2011. For instance, the MoD reported at the RACVIAC conference in Pula that the surface-launched RFAB 275/4 weapons stored at the WSS Kula facility were still problematic to transport and demilitarize (BiH, 2011c).

Bulgaria

Background

The first estimates of Bulgaria's weapons and ammunition surpluses appear in 2004 during the implementation of the Plan for the Organizational Development of the Bulgarian Armed Forces (Plan 2004),[85] which triggered the demobilization and structural reform of many military units. By 2004 the country had downsized its armed forces to 100,000 personnel (including 55,000 reserve forces), with total active service weapons (excluding surplus) numbering around 300,000 units, and small arms and light weapons surpluses roughly estimated at 200,000 units (Rynn, Gounev, and Jackson, 2005, p. 11). Plan 2004 prompted the Bulgarian authorities to begin to determine the quantity and status of surplus stockpiles and to explore disposal methods.

In March 2004 Bulgaria's Council of Ministers approved the National Programme for the Utilization/Recycling and Destruction of Surplus Ammunition on the Territory of the Republic of Bulgaria. The document addressed the ongoing downsizing of the Bulgarian Armed Forces, the movement of ammunition to new locations, and the deterioration of ammunition stockpiles. Under the programme, all ammunition produced prior to 1970 for which chemical stability showed obvious signs of deterioration was reportedly earmarked for destruction (Rynn, Gounev, and Jackson, 2005, p. 100; Georgiev, 2004, p. 77).

By 2003, 160,000–165,000 tonnes of ammunition had been concentrated in MoD storage sites, including more than 7,000 tonnes stored in the open air, and Bulgaria declared a surplus of 59,000–60,000 tonnes of ammunition. Following the restructuring of the Bulgarian army in early 2005, its declared ammunition surplus volumes increased to 67,000 tonnes (Bulgaria, 2010a; Nikolov, 2011, slide 4). In 2007 Bulgaria's ammunition surplus was estimated at 57,000 tonnes, a figure that was reportedly growing by 10 per cent annually (Faltas, 2008, p. 94; Nikolov, 2011, slide 5).

The MoD notes the 'exceptionally low speed of ammunition disposal' until 2008, when Bulgaria established an Integrated Programme Team to 'utilize'[86]

(ostensibly to demilitarize) surplus ammunition. In the same year the Bulgarian MoD started to employ private companies in its demilitarization initiatives (Bulgaria, 2010a).

The July 2008 explosion at the Chelopechene ammunition storage site near Sofia appeared to have prompted the Government of Bulgaria's renewed interest in surplus ammunition stockpiles. In its 2008 report to the UN Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects (Programme of Action), Bulgaria declared a total surplus of 46,577 small arms and light weapons and 1,194,803 items of ammunition, and provided a detailed breakdown of the matériels in question (Cattaneo and Parker, 2008, p. 78; Bulgaria, 2008). In August 2008 Bulgaria further declared a surplus of more than 40,000 tonnes of ammunition (Nikolov, 2011, slide 5). However, it did not report any surplus weapons and ammunition in its 2010 report to the Programme of Action (Bulgaria, 2010b).

In June 2008 Bulgaria adopted an ordinance entitled 'Conditions and Procedures Related to the Creation of Military Stockpiles of the Ministry of Defence', which was updated in August 2010. The ordinance gives the defence minister and the chief of defence responsibility for the control and management of weapons and ammunition stockpiles. Decree No. 54 of 1 April 2010 states that the MoD's Logistics Division is responsible for the armed forces' needs assessment, creation, control, and maintenance of wartime stocks (Bulgaria, 2011, p. 1).

The MoD's Defence Planning Directorate and General Staff apparently review Bulgaria's surplus weapons and ammunition holdings regularly using a specific methodology that employs a formula to calculate operational and reserve small arms, light weapons, and ammunition requirements. The formula—and the volume of operational ammunition it determines—is classified information (Bulgaria, 2011, p. 3).

This review and calculation process generates an annual list of surplus matériels, which includes small arms, light weapons, and ammunition. The listed items are then earmarked for sale or demilitarization (Dimitrov, 2004, p. 100; Lazarevic, 2010, p. 7; Bulgaria, 2011, p. 3). Small arms and light weapons held by the armed forces are reportedly reviewed twice a year, while the list is approved on a yearly basis (Bulgaria, 2010b, p. 16).

Bulgaria recently reviewed the structures, roles, missions, and tasks of its armed forces, and in 2010 issued the Armed Forces Development Plan, which

should lead to a 'restructuring of Bulgarian Army's operational stockpile and [increased] surplus stockpiles' (Bulgaria, 2011, p. 2). It is as yet unclear to what extent the plan addresses the management of surplus ordnance. A concept of surplus 'utilization' was reportedly developed in 2007, but needs upgrading to new force structure requirements. Demilitarization does not appear to have been included among the priority investment projects for the modernization of the Bulgarian Armed Forces (Nikolov, 2011, slides 2, 3).

On 6 April 2011 Bulgaria ratified the 2008 Convention on Cluster Munitions, and its commitments entered into force on 1 October 2011. The terms of the convention urge states to share detailed information on their cluster munitions stockpiles and to begin destroying those stockpiles without delay.

Surplus volume

As of 1 January 2011 Bulgaria reported an estimated ammunition surplus of 15,000 tonnes. It did not provide a detailed breakdown by type, location, weight, or number of items—information that it reported as classified. Bulgaria also claimed that details of its small arms and light weapons surpluses were classified (Bulgaria, 2011, p. 3; Nikolov, 2011, slide 7). Bulgarian MoD representatives confirmed an ammunition surplus of 15,000 tonnes during a joint meeting with US Embassy officials in Sofia on 11 April 2011 and during the Fourth RASR Workshop in Ljubljana in May 2011.

The Bulgarian MoD points out that much has been done to reduce its surplus stockpiles, including work undertaken with US State Department and UNDP funding. For instance, the Bulgarian Joint Command Staff coordinated the destruction of 500 9M32M missiles and 500 9K32M launchers (Strela-2M MANPADS missiles and launchers) in early 2011 (Nikolov, 2011, slide 6). Yet the restructuring of the armed forces, which is scheduled for completion by 2014, should create an additional 24,000–25,000 tonnes of surplus ammunition.[87] Despite recent reductions, Bulgaria's surplus ammunition stockpile is expected to increase to 30,000 tonnes by 2015 (Bulgaria, 2010a).

The growth of Bulgaria's surplus ammunition stockpile will increase destruction costs to an estimated EUR 60 million (USD 73.3 million)—funds that are not likely to be available due to the global financial crisis.[88]

Bulgarian MoD destroying SA-7B missiles and launchers, February 2011. © Bulgarian MoD

Storage sites and conditions

The Small Arms Survey PSSM questionnaire returned by the Bulgarian MoD suggests that there is no national (i.e. centralized) facility to store active and reserve weapons and ammunition.

Active and reserve ordnance depots are located within the premises of military units, and their contents and capacity are classified. Stored ordnance is apparently submitted regularly (no further details are provided) to technical review and maintenance, including polygon and laboratory tests, which determine whether their life cycle and 'military usage expiration' date can be extended. Items that do not meet the criteria are considered 'third category' and proposed for demilitarization (Bulgaria, 2011, p. 3).

Little public information exists on the Bulgarian MoD's surplus weapons and ammunition depots. Georgiev (2004, p. 2) states that all ammunition was stored 'in specially designed storage depots according to the compatibility requirements' and that 'in case of insufficient storage area, the surplus ammunition is stored in open sites at the technical territories of the artillery depots'. Georgiev (2004) also notes that some depots were equipped with integrated alarm systems and temperature and humidity control systems. He reports that all Bulgarian surplus explosive ordnance was submitted to scheduled technical laboratory and field tests at the Central Artillery Technical Testing Range. Surplus ordnance was then sorted according to the manufacturing date criteria and storage conditions, including by dividing surplus ordnance that had been manufactured before and since the 1970s.[89] Georgiev (2004, p. 18) concludes that 'a great part of the surplus ammunition is being stored in open sites, and this significantly accelerates the ageing processes'. According to Rynn, Gounev, and Jackson (2005, p. 89), in 2005 the Bulgarian army stored its wartime reserves at 17 depots across the country.

Past studies referred specifically to the 137th Central Storage and Technical Maintenance Base (CSTMB) in the city of Veliko Tarnovo as the facility to which surplus artillery weapons were transported for storage and destruction in 2004 (Saferworld, 2004, p. 47). According to Rynn, Gounev, and Jackson (2005, p. 89), the General Staff's Logistic Command moved all small arms and light weapons surpluses to the CSTMB. This latter report states that in 2005 CSTMB storage facilities were manned round the clock, in some cases with electronic surveillance and integrated alarm systems.[90]

According to the Bulgarian authorities, inventory and record keeping at the CSTMB site were strict and thorough. A joint SEESAC–Joint Arms Control Implementation Group delegation visited the CSTMB from 30 November to 1 December 2004 and declared the storage systems to be 'satisfactory' (Rynn, Gounev, and Jackson, 2005, p. 90). The CSTMB facility reportedly served as a transitional store for surplus small arms and light weapons sent for destruction to the Terem Ivailo EOOD Veliko Tarnovo factory, located nearby. This procedure was described as advantageous in terms of transport, security, protection, storage, accounting, and economies of scale (Saferworld, 2004, p. 47; Dimitrov, 2004, p. 104).

On 23 July 2008 there was a major explosion at the Chelopechene ammunition depot involving 1,500 tonnes of surplus ammunition. This ammunition is reported to have included:[91]

- small arms ammunition;
- artillery rounds;
- anti-tank guided weapons;
- air defence ammunition;
- surface-to-surface missiles; and
- ten tonnes of TNT.

Although 50 personnel had previously worked at the Chelopechene site while it remained a demilitarization facility, the site was later designated a storage depot and its staff transferred elsewhere. For these reasons, the explosion did not result in reported casualties. Nevertheless, the disaster necessitated a 3 km radius clearance operation (designated 'Hot Summer') around the site, which lasted from 2008 until 2010. Later clearance operations for Chelopechene began in 2011 and involve the underwater clearance of an area of approximately 50 ha (500,000 m^2).[92]

Surplus value

The following sections consider current and future options available to Bulgaria for recouping funds from the sale, donation, or recycling of surplus weapons and ammunition.

Sales

Bulgaria reportedly prioritizes its disposal of surplus, aiming 'first to sell, then to donate and finally to destroy' (Faltas, 2008, p. 91). This prioritization is reflected in Bulgarian legislation, which prohibits the export of weapons and ammunition for demilitarization purposes, allowing only revenue-generating trade exports (Bulgaria, 2011, p. 6). As of 1 January 2011 the Bulgarian MoD reports that it is unable to estimate the current commercial value of Bulgaria's estimated 15,000 tonnes of surplus ammunition (Bulgaria, 2011, p. 3).

There are conflicting reports of the quality of Bulgarian surplus ammunition for sale. Saferworld (2004, p. 46) states that 'surplus ammunition [was] unlikely to be sold because of its negligible market value'. Shortly after this report, however, Rynn, Gounev, and Jackson (2005, p. 11), citing a technical inspection during a UNDP-sponsored ammunition destruction project, note that 'the remaining surplus weapons [were] in good condition'. According to Georgiev (2004, p. 3), Bulgaria recommended for sale explosive ordnance that retained 60 per cent of its original operational performance (based on an analysis of propellant, explosive, and pyrotechnic chemical properties). Bulgaria reportedly reduced this threshold to 20 per cent of original operational performance for aircraft-launched ammunition (Georgiev, 2004, p. 3).

In 2010 a Bulgarian MoD official[93] noted that Bulgaria had received requests for the purchase of 52 different types of surplus ammunition. The official noted that, while a defence investment agency within the Bulgarian MoD is currently responsible for such surplus sales, this agency might be dismantled in response to a strategic review. This is reportedly because, while sale and export are Bulgaria's preferred ways of dealing with surplus ammunition, these processes are 'difficult' because they entail actively searching for buyers.[94]

The Bulgarian MoD reports that it 'utilized'[95] more than 7,000 tonnes of ammunitions in ammunition depots around Sofia and Chelopechene between 2001 and 2005. These stocks included 950 tonnes of ammunition sold in 2002; 20,000 tonnes sold in 2006 by the trade company Acquisition and Commerce; and 11,000 tonnes in 2007. The MoD also reports that Bulgaria sold more than 15,000 tonnes of ammunition between 2009 and 2011 (Nikolov, 2011, slides 4, 5).

In 2011 the Bulgarian MoD declared that in the period 2009–10 it had sold the quantities (pieces) of surplus weapons and ammunition listed below. Some

of the reported weapons and ammunition categories are unclear, but have been presented below as the Bulgarian MoD reported them:

- guns: 300;
- cannons and howitzers: 290;
- armoured vehicles: 330; and
- ammunition, of which:
  - gunfire: 12 million;
  - artillery, mortar, and anti-tank ammunitions: 190,000; and
  - air missiles and bombs: 3,900 (Bulgaria, 2011, p. 4).

The Bulgarian MoD did not disclose the sale price of the ordnance listed above, either in total or by unit price.

Donation

As small number of Bulgaria's surplus transfers have been donations. For example, Bulgaria has recently provided 20 'cannons' and 18 'guns' to various museums and war memorials (Bulgaria, 2011, p. 4).

Recycling

International donors pay Bulgarian demilitarization plants, such as those at Terem, a fixed price to process small arms ammunition. For example, during a typical small arms ammunition (up to 14.5 mm in calibre) destruction operation (date unspecified by the source), the US government paid the plant the following:

- 7.62 x 39 mm: USD 0.06 per piece;
- 12.7 x 108 mm: USD 0.23 per piece; and
- 14.5 x 114 mm: USD 0.45 per piece.[96]

The value of the surplus can also be estimated by looking at the income generated from the sale of by-products and scrap (R3). In Bulgaria, this income remains at the disposal of the MoD and is reallocated 'according to priorities' (Bulgaria, 2011, p. 4).

Georgiev (2004, pp. 55, 58, 61, 64) calculated that the disposal of Bulgaria's total volume of surplus explosive ordnance, estimated at 76,100 tonnes in 2005, would provide the following by-products:

- 7,585 tonnes of powder (pyroxyline, nitroglycerine, and diglycol) with important industrial applications in the mining and quarrying industries, and for some other commercial purposes;
- 4,900 tonnes of explosives (TNT, RDX, TNT with smoke and flare-intensifying elements, TDU, plastite, and ammonite);
- 35,000 tonnes of scrap metal (ferrous and non-ferrous); and
- 23,000 tonnes of packing materials (wood, paper, plastic, and rubber).

When in March 2004[97] Bulgaria earmarked ammunition produced prior to 1970 for destruction, it estimated destruction costs at EUR 47.3 million (USD 60 million in 2004), with destruction costs of surplus small arms and light weapons ammunition of more than EUR 6.3 million (USD 8 million in 2004). This initiative was expected to generate profits from the sale of 62,510 tonnes of recycled material of an estimated EUR 16.52 million (USD 21 million in 2004) (Georgiev, 2004, p. 70; Rynn, Gounev, and Jackson, 2005, p. 103). This suggests a 30 per cent recovery of the funds invested in the disposal process (Georgiev, 2004, p. 77).

Larger ordnance, such as artillery shells, can also provide a source of revenue from scrap by-products. The Terem Tsar Samuil EOOD Kostenets plant steams out TNT from large items of ammunition and recycles it for civilian use, at an approximate rate of six tonnes of TNT per month.[98] The shells are sold as scrap metal. The Bulgarian MoD (Bulgaria, 2011, pp. 6–7) provided estimates of the resale prices for such scrap metal:

- copper: BGN 8,000 (USD 4,989) per tonne;
- brass: BGN 5,500 (USD 3,430) per tonne;
- steel: BGN 3,300 (USD 2,058) per tonne; and
- aluminium: BGN 2,000 (USD 1,247) per tonne.

Estimated cost to the defence budget

The following sections address the costs to Bulgaria's defence budget of managing surplus weapons and ammunition stockpiles. These burdens include activities related to the maintenance of storage infrastructure (including ensuring the safety and security of stockpiles and the relocation of ammunition

from one site to another); the allocation of personnel to ensure the safe and secure storage, handling, transportation, and accounting of surplus stockpiles; and the costs incurred in demilitarizing or destroying surpluses.

Storage costs

When in March 2004 Bulgaria earmarked[99] ammunition produced prior to 1970 for destruction, it estimated storage costs for all surplus ammunition for a ten-year period at EUR 29 million (USD 36.8 million in 2005) (Rynn, Gounev, and Jackson, 2005, p. 103).

Georgiev (2004, p. xvii) compares two options for addressing Bulgaria's surplus ammunition, which he describes as (1) establishing a 'utilization centre' for the demilitarization and recycling of ammunition, or (2) 'temporizing' with long-term ammunition storage. Georgiev (2004, pp. 70–77) estimates that the expenses of temporizing with the storage of 80,000 tonnes total surplus ammunition for a period of ten years would amount to EUR 30 million (USD 38 million in 2004). The estimated costs of demilitarization are addressed below.

Faltas (2008, p. 94) reports that in 2007 the annual storage and maintenance costs associated with Bulgaria's (then estimated) 57,000 tonnes of surplus ammunition amounted to BGN 6.5 million (USD 5 million).

Personnel costs

Bulgaria has largely privatized the management of its depots and private companies contracted by the MoD reportedly protect the weapons and ammunition depots. In this respect, there are no direct personnel costs to the MoD, but it does not report how much of the defence budget has been allocated to private security companies for guarding depots or to maintaining weapons and ammunition storage sites (Bulgaria, 2011, p. 5).

Demilitarization costs

Working with a figure of 80,000 tonnes total surplus ammunition, Georgiev (2004, pp. 67–72) estimates that the investment costs of a utilization (demilitarization) centre with a disposal capacity of 10,000 tonnes per year would total EUR 9–10 million (USD 11.4–12.7 million in 2004). Disposal in itself would cost an additional EUR 47 million (USD 60 million in 2004), bringing the total utilization project expenditure to EUR 56–57 million (USD 71.2–72.5 million in 2004).

In this calculation, the immediate cost of disposal would be around double that of the cost of storage over ten years (EUR 30 million, or USD 38 million in 2004). However, Georgiev notes that annual expenditure for 'temporizing' (long-term storage) would exceed annual expenditure for 'utilizing' after just six years. In other words, money would be spent on storage, instead of on disposal. In addition, if initiated rapidly, sales revenue from secondary products—a 30 per cent rate of recovery of scrap material valued at about EUR 16.5 million (USD 21 million in 2004)—would offset a certain proportion of disposal expenses (Georgiev, 2004, p. xvii). The Terem Tsar Samuil EOOD Kostenets plant was established in terms of this perspective.

Private companies do much of the demilitarization in Bulgaria through public tendering in terms of the Public Procurement Act (Bulgaria, 2011, p. 7). In 2008 the MoD outsourced the demilitarization of 14,900 tonnes of ammunitions to three private companies at a cost of BGN 27 million (USD 17 million in 2008): at the time of writing, 90% of the ammunition had been demilitarized. In 2011 the MoD allocated BGN 1.3 million (USD 0.95 million) to outsourcing the demilitarization of approximately 4,200 tonnes to private companies. The MoD has planned to demilitarize approximately 39,000 tonnes of ammunition between 2012 and 2015 at an estimated cost of BGN 114 million (USD 83.2 million in 2011) (Bulgaria, 2011, p. 8).

Priorities for destruction

The Small Arms Survey PSSM questionnaire returned by the Bulgarian MoD does not single out specific ammunition items to be prioritized for immediate destruction.

Croatia

Background

Croatia's first surplus estimates appeared in 2006, during the transformation and modernization of the Croatian Armed Forces (CAF) in preparation for NATO membership. Croatia's 2006 Long-term Development Plan (LTDP) initiated military reform, including the planned downsizing and restructuring of CAF to 16,000 active forces and 6,000 reserves (SEESAC, 2006b, p. 45). CAF currently contains approximately 20,000 fully professional soldiers.[100]

The 2006 LTDP relegated 372 MANPADS, 953 mortars, and 58 anti-tank guided weapons to surplus, but did not list any surplus small arms or small arms ammunition (Croatia, 2006, p. 22). By 2006 Croatia's operational requirements for small arms and light weapons had not been formalized. However, the LTDP indicated that the Croatian MoD was in possession of more than 260,000 small arms and light weapons. Estimates suggested that only 69,000 of these weapons would be required in the future (SEESAC, 2006b, p. 8). This left an estimated CAF surplus of approximately 190,000 small arms and light weapons (SEESAC, 2006a, p. 41).

In 2006 CAF stockpiled an estimated 170 million rounds of ammunition, of which a significant (but unknown) proportion was considered to be surplus and inappropriate for sale (SEESAC, 2006b, p. 8). The total CAF ammunition stockpile included ammunition and explosives captured during the Croatian War of Independence (1991–95), in addition to domestically manufactured and imported ammunition. The 2006 LTDP did not identify CAF's operational requirements for ammunition (Bakija, Bogović, and Lončarić, 2009, slide 2).

UNDP (2009) completed an ATA in February 2009, but the MoD did not release information on any ammunition and explosives scheduled for disposal and demilitarization. An ammunition matrix used in the needs assessment—designed to facilitate logistical planning for demilitarization by dividing conventional ammunition into generic groups requiring different demilitarization technologies—remained substantially empty. For these reasons, a detailed examination of Croatia's ammunition stockpile was not feasible.

Nevertheless, the needs assessment calculated CAF's total small-calibre (14.5 mm and below) ammunition stockpile at 170 million[101] rounds, or 3,400[102] tonnes AUW[103] (UNDP, 2009, p. 8, Table 4). There is, however, a discrepancy between the surplus tonnage reported in the needs assessment (3,400 tonnes AUW) and information provided by the Croatian MoD in 2009. Croatian MoD officials report that, according to the 2008–15 LTDP, CAF has determined its ammunition requirements at approximately 17,000 tonnes of all ammunition types. This implies an ammunition surplus of approximately 21,000 tonnes AUW/gross weight, described as 'non-perspective, unserviceable, unstable' ammunition (Bakija, Bogović, and Lončarić, 2009, slide 8).

The Croatian MoD provided the following additional figures in May 2011. The country:

- destroyed 6,500 tonnes of ammunition and explosive material between 2001 and 2010;
- destroyed 26,000 pieces of small arms and light weapons in 2007 and 2008;
- destroyed 929 MANPADS in 2009 (with USD 1 million in financial support from the US government); and
- disabled 1,062 pieces of large conventional weapons (including tanks, armoured vehicles, cannon, aircraft, and helicopters) between 1996 and 2010 (Bakija, 2011).

Croatia's 2010 report to the UN Programme of Action states that CAF weapons and ammunition requirements are determined through the use of a 'Table for Organization and Equipment', which is compared against existing stockpiles to identify surplus. Once identified, the CAF General Staff proposes the means of surplus disposal. The MoD makes the final decision to dispose of surplus with reference to the Regulation on Sales of Obsolete Weapons and Defence Equipment (Croatia, 2002). Surplus stocks that are not sold are reportedly destroyed in CAF facilities (Croatia, 2010, p. 13).

Surplus volume

The Croatian MoD estimates its ammunition surplus at 19,000–20,000 tonnes. It describes this surplus as 'mostly usable', but unfit for CAF. Included in this

figure are 200 tonnes of white phosphorus and 3,000 tonnes of explosives, of which the latter are reportedly 'easy to dismantle'. The rest of the surplus ammunition is composed of 20 mm–203 mm calibre ordnance.[104] In its response to the Small Arms Survey PSSM questionnaire, the Croatian MoD indicated that a precise breakdown of surplus ammunition is 'classified' information, but later provided the following breakdown of ammunition surplus to the Survey:

- 42 per cent cannon, tank, and cluster ammunition (20–203 mm);
- 15 per cent infantry ammunition (14.5 mm and smaller);
- 15 per cent MLRS and air force missiles;
- 10 per cent anti-tank mines;
- 10 per cent bulk explosives, propellants, fuses, and warheads;
- 5 per cent mortar bombs (60–120 mm);
- 2 per cent aircraft bombs; and
- 1 per cent torpedoes (Bakija, 2011).

The Croatian MoD also listed 170 tonnes of surplus cluster munitions[105] slated for destruction with support from Norwegian People's Aid (Bakija, 2011). These items are presented in Table 17.

The MoD does not declare any surplus small arms and light weapons (Croatia, 2011).

Croatia's new LTDP for the period 2011–20 is expected to be complete following the finalization of the Strategic Defence Review. During 2011 CAF General Staff intend to finalize a list of 'non-prospective' (surplus) small arms, light weapons, and larger conventional weapons by type and quantity (Bakija, 2011).

Table 17 Croatian cluster ammunition stockpile slated for destruction

Ammunition type	Quantity (pieces)
MRLS M87 'ORKAN', 262 mm	28
Mortar bomb, cluster, 120 mm, M93	7,129
Air bomb BL-755	92
Air bomb RBK 250 ZAB-2,5M	52
Air bomb RBK 250 PTAB-2,5M	87
Air bomb RBK 250-275 AO 1Sch	6

Source: Bakija (2011)

Storage sites and conditions

In 2006 reports indicate that CAF stored its surplus weapons and ammunition in 40 locations, which were located in or adjacent to 34 cities and towns. The MoI reportedly stored its reserve and surplus weapons at four locations across the country (SEESAC, 2006b, p. 49). In 2009 the Croatian MoD reduced the number of ammunition storage sites to 25 (Bakija, Bogović, and Lončarić, 2009, slide 5).

In 2009 a UNDP ATA reported that CAF stored ammunition in 28 locations, although it intended to reduce the number of sites to between three and five locations (UNDP, 2009, p. ii). The Croatian representative to the Third RASR Workshop held in Sarajevo in November 2010 confirmed that Croatia was in the process of upgrading three prospective locations.[106] According to the UNDP ATA, the three storage locations that Croatia was likely to modernize for long-term use included Hrvatksi Zdral (Doljani),[107] Potkop (Tribunj),[108] and Debela Glava (located near Slunj).[109] Table 18 presents UNDP's summary of conditions in the three prospective sites.

The UNDP assessment team described the overall physical standards of the sites as 'fair', but stressed that the following improvements would need to be undertaken if the sites were to meet international best practice and NATO standards:

- an upgrade of the perimeter fencing;
- an upgrade of doors and security locks or padlocks on the doors of older construction ESHs;

Table 18 Conditions at Croatian prospective ammunition storage areas

Location	Condition of explosive storehouse (ESH)	Adequate IQD* to NATO standards	Adequate OQD** to NATO standards
Hrvatski Zdral, Doljani	Fair	No	No
Potkop, Tribunj	Fair	Yes	Yes
Debela Glava, Slunj	Good/fair	No	Yes

* Inside quantity distance (the safety distance between individual explosive storehouses and ammunition processing areas).

** Outside quantity distance (the safety distance from the ammunition storage area to civilian roads and habitation).

Source: UNDP (2009, Table 1)

- the introduction of electronic surveillance systems;
- the removal of extensive vegetation in and around the depots; and
- improved access controls.

UNDP considered that the storage safety standards of the Hrvatski Zdral (Doljani) ASS were only 'just adequate'. The assessment team noted that different lots of ammunition had not been separated, painted markings on boxes often did not accurately reflect their contents, and there was no clear marking or signage to indicate hazard divisions or compatibility groups.

UNDP also recommended improving the propellant surveillance system. The report observes that storing much of the ammunition in the open, or in storehouses with ineffective humidity controls, accelerated the 'ageing' of the propellant and resulted in stabilizer levels that were likely to differ from those of 'master samples'. The assessment team do not comment on how the propellant testing programme was conducted, but state that 'laboratory capacity is available in Croatia and only needs to be improved to carry out these tests' (UNDP, 2009, p. 4).

The Croatian MoD's laboratory has reportedly been conducting NATO-standard propellant stability tests[110] with qualified personnel for more than ten years. Testing equipment is relatively inexpensive, but qualified staff require 10–20 years of training.[111]

The 2009 UNDP ATA report (UNDP, 2009, p. iii) made a number of recommendations. Of these, two are probably most important from the perspective of safe ammunition management:

- the reclassification of the ammunition stockpile according to the UN Globally Harmonized System of Classification and Labelling of Chemicals and the UN Recommendations on the Transport of Dangerous Goods Model Regulations; and
- the improvement of the existing ammunition management system according to the principles contained within the NATO Allied Ammunition Storage and Transport publications.[112]

In its responses to the Small Arms Survey PSSM questionnaire, the Croatian MoD stated that the names, locations, and descriptions of the weapons and ammunitions depots that are currently used to store CAF ordnance are classified information (Croatia, 2011).

Of CAF's current 24 ASSs, two are dedicated to the storage of surplus ammunition. An additional five sites (additional to the 24 ASSs) are dedicated to the storage of surplus weapons (Bakija, 2011).

Surplus value

The following sections consider current and future options available to Croatia for recouping funds from the sale, donation, or recycling of surplus weapons and ammunition.

Sales

For Croatia, the sale of MoD stockpiles has long been the preferred option for disposing of surplus small arms and light weapons. For instance, according to Lazarevic (2010, p. 7), the Regulation on Sales of Obsolete Weapons and Defence Equipment (Croatia, 2002) stresses that sales must take precedence over destruction.

In 2006 SEESAC documented surplus sales by the Croatian government-owned export company, Agencije Alan, based in Zagreb. These figures are listed in Table 19. They suggest that Croatia exported almost USD 4.4 million of surplus weapons and ammunition between 1999 and 2005.

Table 19 Value of surplus weapons and ammunition sold by Croatia, 1999–2005

Year	Value (USD)
1999	875,000
2000	223,650
2001	915,175
2002	1,650,000
2003	-
2004	640,000
2005	85,000

Source: SEESAC (2006b, p. 10)

In 2009 Croatia sold ten million repackaged rifle and pistol cartridges through its state export agency. This ammunition had been manufactured by various companies and consisted of different calibres, which, according to the Croatian MoD, made it difficult to destroy.[113] No surplus sales were reported in 2010.

In its response to the Small Arms Survey PSSM questionnaire, the Croatian MoD reported that it is unable to estimate the sale value of its current

stockpiles of surplus ammunition. Croatian authorities were not able to provide the Small Arms Survey with examples of unit prices for surplus weapons or ammunition previously sold by Croatia (Croatia, 2011).

The Croatian MoD reports that it sold approximately 5,800 tonnes of surplus ammunition between 2001 and 2009, valued at EUR 8.5 million (USD 10.5 million) (Bakija, 2011).

Donation

Croatia reports having made a number of donations of small arms and small-calibre ammunition since 2007. These include:

- 1,000 Kalashnikov-pattern assault rifles and 300,000 rounds of 7.62 x 39 mm ammunition donated to Afghanistan in 2007 (Bakija, 2011); and
- 500 Kalashnikov-pattern assault rifles donated to Iraq in 2010 (with an estimated value of USD 50,000) (Croatia, 2011, p. 2).

The Croatian MoD is reportedly preparing a donation of 15,000 Kalashnikov-pattern assault rifles for the Afghan National Army (Bakija, 2011).

Estimated cost to the defence budget

The following sections address the costs of managing surplus weapons and ammunition stockpiles to Croatia's defence budget. These burdens include activities related to the maintenance of storage infrastructure (including ensuring the safety and security of stockpiles and the relocation of ammunition from one site to another); the allocation of personnel to ensure the safe and secure storage, handling, transportation, and accounting of surplus stockpiles; and the costs incurred in demilitarizing or destroying surpluses.

Storage costs

In its response to the Small Arms Survey PSSM questionnaire, the Croatian MoD stated that the budget spent annually on surplus weapons and ammunition storage, infrastructure development, and maintenance to ensure safe storage in national weapons and ammunition depots is classified information (Croatia, 2011).

Personnel costs

In its response to the Small Arms Survey PSSM questionnaire, the Croatian MoD stated that the cost of CAF personnel employed in maintaining and securing weapons and ammunition storage sites is classified information (Croatia, 2011).

Demilitarization costs

Information from Croatian MoD representatives at RASR and RACVIAC workshop discussions[114] in 2011 suggests that the Croatian MoD has recently (exact time period unclear) calculated that the industrial demilitarization of its current surplus ordnance stockpile would cost an estimated EUR 9 million (USD 12.9 million).[115] It is unclear which specific ordnance (weapons, ammunition, or both) this figure refers to.

Priorities for destruction

Croatia ratified the Oslo Convention on 5 June 2009 (it entered into force on 1 August 2010). The destruction of its cluster munitions stockpile appears to be Croatia's main priority in terms of surplus reduction.

Norwegian People's Aid carried out a feasibility study in 2011, and preparations for the implementation of a destruction plan for 170 tonnes of cluster munitions are reportedly ongoing. The development and research phase of this plan was reportedly finished in June/July 2011 (Bakija, 2011).

As of May 2011 the MoD had also singled out for immediate destruction:

- 1,000 RPG-22 rockets;
- 1,000 RPG-7 rockets;
- 71 SA-7B rockets; and
- 34 9P58 gripstocks for SA-7B launchers (Bakija, 2011).

It is unclear whether this ordnance had been destroyed at the time of writing.

Macedonia

Background

Macedonia's independence from Yugoslavia in 1991 resulted in the creation of a new Macedonian MoD and the Army of the Republic of Macedonia (Armija na Republika Makedonija or ARM). In August 2003 ARM stockpiled a total of 85,500 small arms and light weapons (Grillot et al., 2004, p. 16).

In June 2004 ARM comprised 55,000 personnel, including 5,000 conscripts and 44,000 reserves. By the end of 2007 the reformed ARM had downsized to approximately 10,000 personnel (7,600 active personnel and 2,500 reserves) (SEESAC, 2006a, p. 57). Macedonia's forces further decreased to approximately 8,000 troops in 2010 and 2011 (Rizeski, 2011, slide 9), and in November 2010 the Macedonian government adopted a decision to destroy the resulting excess ammunition.

Surplus volumes

Macedonia's latest report to the UN Programme of Action states that 'there is no centralized system of monitoring [stockpiles] in place', but that small arms and light weapons stocks are reviewed annually by the MoD's General Staff. The report also states that 'no surplus calculation was made during 2009' (Macedonia, 2010, pp. 11, 12).

However, the Macedonian MoD provides national stockpile figures, which are listed in Table 20. These figures pertain to weapons and ammunition held at the end of 2010.

With respect to surplus, Table 21 lists hand grenades, M57 rockets, 60 mm mortar bombs, and artillery and cannon ammunition identified by the Macedonian MoD as surplus. These figures reflect numbers of items, not tonnes.

The MoD provided a more detailed breakdown of its surplus ammunition items in May 2011 (see Table 22). Again, these figures reflect numbers of items, not tonnes.

Table 20 Weapons and ammunition stockpiles reported by the Macedonian MoD at the end of 2010

Weapons and ammunition type	Quantity (pieces)
7.62 mm & 7.9 mm ammunition	10,000,000
7.62 mm & 7.9 mm handguns & rifles	15,000
Grenade launchers	2,500
Automatic firearms	10,000
Light machine guns	3,000
60 mm mortars	600
82 mm recoilless gun	300
40 mm anti-aircraft guns	100
76 mm cannons	50

Source: Rizeski (2011)

Table 21 Excess class-5 ammunition reported by the Macedonian MoD at the end of 2010

Weapons and ammunition type	Quantity (pieces)
Hand grenades (all types)	40,000
M57 hand-launcher anti-tank shells	35,000
60 mm mortar shells	100,000
T-55 100 mm tank ammunition	15,000
T-34 85 mm tank ammunition	1,000
20 mm & 40 mm anti-aircraft gun shells	100,000

Source: Rizeski (2011)

Table 22 Surplus ammunition reported by the Macedonian MoD in May 2011

Surplus ammunition type	Quantity (pieces)
5.45 x 39 mm cartridges	3,350
Hand grenades cumulative	41,284
20 mm anti-aircraft projectiles	122,019

40 mm anti-aircraft projectiles	17,194
60 mm mortar bombs	100,000
81 mm projectiles	35,782
82 mm projectiles (Bulgarian)	6,949
82 mm projectiles (M72 recoilless rifle)	5,090
82 mm projectiles	4,111
85 mm projectiles	905
100 mm projectiles	16,400
128 mm rockets	9,100
Maljutka (9M14) rockets	74
M52 hand grenades	682
MANPADS missiles (9M39 for 9K38 Igla)	20
Surface-to-air guided missiles	72
Total	**363,032**

Source: Mecinovic (2011)

Macedonian defence officials predict a revised armed force structure, which they expect to have been implemented by the end of 2013, with the result that the surplus is expected to grow (Rizeski, 2011).

Storage sites and conditions

In 2004 Macedonia's weapons and ammunition stockpiles were reportedly kept 'in designated military facilities such as military barracks and warehouses' and 'held under strict stockpile management procedures while in storage or transport' (Grillot et al., 2004, p. 15).

SEESAC reported in 2006 that Macedonian armed forces and police depots were controlled and inventoried on a regular basis. The MoD was reported to review its stocks monthly, and weapons management software was developed with UNDP the Former Yugoslav Republic of Macedonia (FYROM) to address stockpile management problems (SEESAC, 2006c, p. 58).

Since then, donor funding seems to have focused on upgrading MoI depot facilities. In order to improve stockpile management and the security of weapons that had been seized and collected, the MoI upgraded a central storage site as early as 2005 (SEESAC, 2006c, p. 58). This site is again mentioned in Macedonia's 2010 report to the Programme of Action (Macedonia, 2010, p. 12). It is assumed that this refers to the Orman ammunition depot, which was officially inaugurated by the MoI in Skopje on 26 July 2011. The upgrade of the storage facility was supported by the EU and implemented by UNDP/SEESAC.

In its response to the Small Arms Survey PSSM questionnaire, the Macedonian MoD listed the following ordnance storage depots as each having an 'occupied storage space' of 7,900 m^2: Erebino/Tetovo, Celopeci/Kichevo, Drenov Dol/Skopje, Krivi Dol/Stip, Krivolak/Negotino, Kukul/Prilep, Otovica/Veles, Proevci/Kumanovo, and Maucker/Ohrid (Macedonia, 2011c).

The MoD did not specify whether the depots are used to house ammunition or weapons, or whether they contain both. Macedonia's 2009 report to the UN Programme of Action, however, reports that the country stores weapons and ammunition separately (Macedonia, 2010, p. 12).

The figures also seem to imply (occupied storage space) that all of the depots are fully stocked. However, Macedonia reports that current occupied storage space for all sites combined is around 60 per cent of total storage capacity (Macedonia, 2011b). It is probable that 'occupied storage space' is a term used to denote maximum storage capacity. Table 23 indicates the tonnage of ordnance stored in each depot and identifies their locations in Macedonia, which are shown in Map 2. If the above assumptions regarding maximum storage capacity are correct, only the Erebino facility is fully stocked.

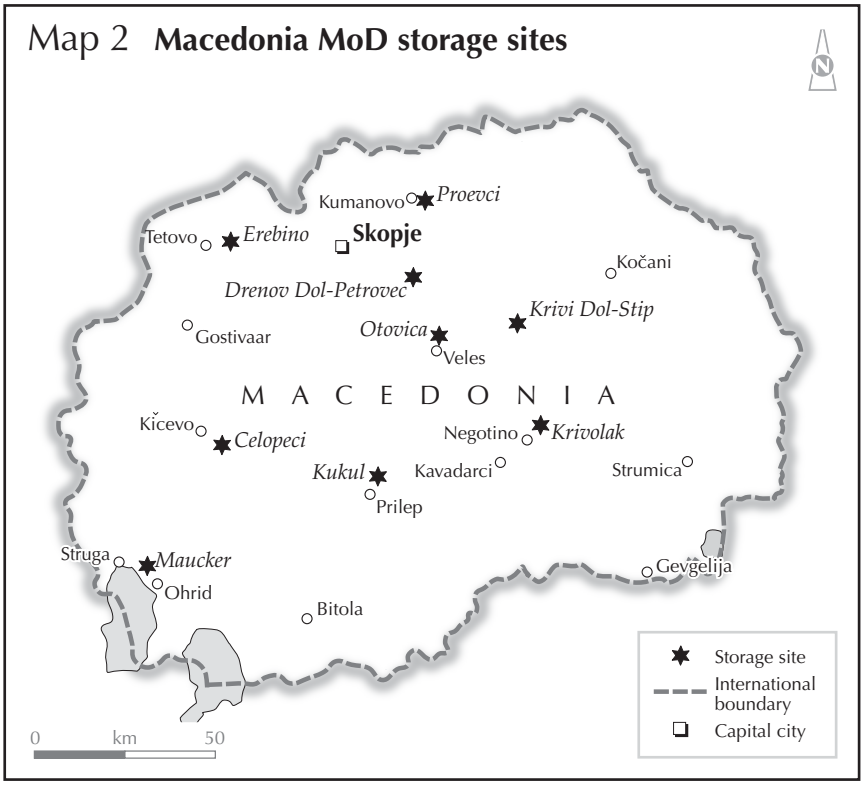
The Macedonian MoD did not specify the status of the sites listed above. For this reason, it is unclear whether all of them are permanent facilities or whether some have been scheduled for decommissioning. Likewise, it is unclear whether the sites contain operational, reserve, or surplus weapons and ammunition. The Erebino facility also acts as a disposal plant and store for ammunition awaiting demilitarization (Macedonia, 2011b).

Approximately 30 per cent of Macedonia's weapons and ammunition depots have reportedly been 'expertised' (which suggests some form of technical assessment). Overall, Macedonia reports that the ammunition is accounted for

Table 23 Macedonian MoD stockpiles by location and quantity of ordnance stored

Storehouse	Total (tonnes)
Erebino	7,900
Celopeci	5,900
Krivi Dol	3,000
Drenov Dol	3,400
Krivolak	4,300
Otovica	4,300
Maucker	900
Kukul	1,700
Proevci	1,300
Total	**32,700**

Map 2 **Macedonia MoD storage sites**



Source: Macedonia (2011a)

and assessed as being 'in good condition' (Rizeski, 2011). The Macedonian MoD reports that it tests an average of 60–80 rounds of ammunition annually for powder stability (Macedonia, 2011c).

The US DTRA performed a PSSM assessment of five Macedonian military ammunition storage facilities between 27 February and 5 March 2011 (Mecinovic, 2011).

Surplus value

The following sections consider current and future options available to Macedonia for recouping funds from the sale, donation, or recycling of surplus weapons and ammunition.

Sales

In 2006 SEESAC reported that the Macedonian MoD had 'very little surplus weaponry to market in recent years, and [that] in any case there would be little interest from purchasers in any surplus weaponry that was designated for sale, because of its age' (SEESAC, 2006a, p. 57).

In its 2009 national report to the UN Programme of Action, Macedonia (2010, p. 12) indicates that surplus weapons are either sold or destroyed. Yet Lazarevic (2010, p. 8) states that in practice Macedonia has managed to dispose of its surplus weapons through either destruction or redistribution among other state institutions and that, as of 2010, none had been sold nor offered internationally via tender.

Donation

Macedonia does not donate state surplus to foreign states, but rather redistributes it to other ministries or national organs that are legally allowed to hold weapons. It also distributes seized and confiscated weapons among other ministries (Lazarevic, 2010, p. 8).

Recycling

The Macedonian MoD's response to the Small Arms Survey PSSM questionnaire did not indicate whether R3 techniques were used to reduce destruction

costs by selling scrap metal, propellants, and explosives resulting from industrial dismantling. It is likely that this process is used at the Erebino facility, but no further details were provided (Macedonia, 2011c).

Estimated cost to the defence budget

The following sections address the costs of managing surplus weapons and ammunition stockpiles to Macedonia's defence budget. These burdens include activities related to the maintenance of storage infrastructure (including ensuring the safety and security of stockpiles and the relocation of ammunition from one site to another); the allocation of personnel to ensure the safe and secure storage, handling, transportation, and accounting of surplus stockpiles; and the costs incurred in demilitarizing or destroying surpluses.

Storage costs

In its response to the Small Arms Survey PSSM questionnaire, the Macedonian MoD reported that it spends MKD 360,000 (USD 8,430) on 'ammunition maintenance'. It did not mention which specific activities this budget funded. It is unlikely that this figure includes the maintenance of stockpile storage facilities (Macedonia, 2011c).

Personnel costs

A total of 115 personnel (ARM members) have been assigned to provide security to ARM warehouses. The weekly wages of these security personnel are MKD 4,590 (USD 107.5) per person. Extrapolation from this figure would suggest annual expenditure on stockpile security personnel of around USD 630,000.

Macedonia reports that it allocates around MKD 60,000 (USD 1,405) annually to the training of personnel in the 'Training Command' (Macedonia, 2011c).

Demilitarization costs

The Macedonian MoD's response to the Small Arms Survey PSSM questionnaire did not indicate how much the state spends annually on demilitarization operations and related activities (Macedonia, 2011c).

Priorities for destruction

In its response to the Small Arms Survey PSSM questionnaire, the Macedonian MoD reports that the destruction of 152 Šturm (9M114) missiles is an immediate surplus destruction priority (Macedonia, 2011c). The missiles are not explicitly mentioned in the ammunition surplus declared by Macedonia and listed in the 'Surplus volumes' section above.

Montenegro

Background

After the Montenegrin parliament declared independence from the State Union of Serbia and Montenegro on 3 June 2006, Montenegro's MoD identified 74,000 different weapons and more than 12,000 tonnes of ammunition in its national stockpiles (Montenegro, 2011c, p. 2). Of the 12,000 tonnes of ammunition, the MoD identified a surplus of more than 9,700 tonnes (see Table 24).

In 2007 UNDP Montenegro and SEESAC performed an ATA of the condition of Montenegro's national ammunition stockpile. This assessment calculated the country's demilitarization requirements at 9,927 tonnes AUW of surplus ammunition, explosives, and related matériel. The surplus included a large quantity of AK-20K oxidiser (87.6 tonnes) and TG-2 liquid propellant (41.2 tonnes) for P20, P21, and P22 STYX missiles (SEESAC, 2007a, Table 5).

In 2007 the Montenegrin MoD signed a technical agreement (TA) with the US State Department. This TA foresees the destruction (through OB/OD) of MoD surplus ammunition, and surplus weapons and ammunition held by the Montenegrin police.[116] As of May 2011 the project had reportedly demilitarized 890–900 tonnes of ammunition.[117]

In addition to this TA, in the same year Montenegro entered into a joint capacity development programme with UNDP and the OSCE. The initiative, which is known as the Montenegro Demilitarization (MONDEM) programme, addressed the demilitarization and safe storage of conventional ammunition.

By 2010 MONDEM had completed the disposal of toxic hazardous waste[118] and the demilitarization of 1,025 pieces (approximately 3,300 tonnes) of conventional weaponry (Montenegro, 2011a). The programme earmarked an additional 1,300 tonnes of surplus ammunition for demilitarization in two phases (Keković, 2011). As of November 2010 the first phase had destroyed 430 tonnes of ammunition from the existing surplus stockpile of 1,300 tonnes. However, the programme is currently on hold due to funding shortages.[119] Phase II of

Table 24 Evolution of Montenegro's national, operational, and surplus ammunition stockpiles, 2006–11 (tonnes)

	2006	2011
Total	**12,136.82**	**6,917.96**
Operational requirements and needs of Montenegrin Armed Forces	2,385.37	2,385.37
Surplus	9,751.45	4,532.59

Source: Montenegro (2011b)

the MONDEM programme is expected to destroy the remaining 870 tonnes of ammunition (Montenegro, 2011b).

As Table 25 indicates, between 2006 and 2011 the Montenegrin MoD, TA, and MONDEM programmes, in addition to a German Embassy initiative, reduced Montenegro's small arms and light weapons surplus stockpile by around 46,000 pieces. In early 2011 the country's surplus small arms and light weapons stockpile was 13,043 pieces.

The Montenegrin MoD has control over and responsibility for all military weapons and ammunitions stockpiles (operational and surplus) in the country. The Material Resources Section of the MoD manages weapons and ammunition stockpiles (operational and surplus), prioritizes destruction, and maintains operational records related to the storage, maintenance, and disposal of surplus.

The Ministry of Internal Affairs is responsible for 'surplus' weapons and ammunition seized and collected from civilians. It reportedly coordinates its activities with the MoD (Montenegro, 2011c, p. 1).

Table 25 Evolution of Montenegro's national, operational, and surplus small arms and light weapons stockpiles, 2006–11 (pieces)

	2006	2011
Total	**74,393**	**27,898**
Operational requirements and needs of Montenegrin Armed Forces	14,855	14,855
Surplus	59,538	13,043

Source: Montenegro (2011b)

Surplus volumes

In its response to the Small Arms Survey PSSM questionnaire, the Montenegrin MoD reports that it classifies weapons as 'surplus' when they are 'outdated and of no future use for the VCG [Montenegrin Armed Forces]'. It classifies ammunition of various calibres as 'surplus' when it is 'unstable and threatens to become unstable' or is 'prohibited by international conventions' (Montenegro, 2011c, p. 2).

Montenegro reports that its requirements for weapons and ammunition include around 15,000 small arms and light weapons, various larger weapons systems, and around 2,500 tonnes of ammunition (Montenegro, 2011c, p. 2).

A Montenegrin MoD report (Montenegro, n.d.) provides an overview of the armed forces' operational ammunition stockpile. This document lists:

- 23.4 million cartridges (ranging from 9 mm to 12.7 mm in calibre);
- 143,000 mortar bombs (60–120 mm), VBR M75 grenades, and 30 mm grenades for the ABG M93 grenade launcher;
- 8,000 rockets, including for 82 mm RKZ M72 recoilless rifles, 64 mm M80 rocket launchers, and 90 mm M79 rocket launchers; and
- 7,000 122 mm artillery shells.

Importantly, this document notes the quantity of explosive, propellant, and other properties contained in each item. Such a breakdown by ammunition type and properties is a particularly important component of anticipating demilitarization costs. For example, the document indicates that the operational stockpile contains 531,537 tonnes of explosive (including RDX, pressed TNT, filled TNT, and tetryl), 200,232 tonnes of propellant, and 1,105 tonnes of white phosphorus.

As of mid-2011 the Montenegrin MoD reported 13,000 pieces of surplus small arms and light weapons in the national stockpile, including 2,200 pieces that had been sold but were awaiting delivery. Omitting the sold pieces, Montenegro's surplus small arms and light weapons stockpile comprises 10,800 pieces (Montenegro, 2011c, p. 3).

At the same time, Montenegro estimated its ammunition surplus at 4,500 tonnes, including more than 1,400 tonnes that had been sold but which were

awaiting delivery. Omitting the sold ammunition, the remaining 3,100 tonnes include a residual 870 tonnes from the MONDEM destruction programme, around 920 tonnes scheduled for destruction by the TA, and an additional 1,300 tonnes to be offered for sale (Montenegro, 2011b; 2011c, p. 3).

Storage sites and conditions

According to the 2007 UNDP ATA, the Montenegrin MoD stored ammunition in nine locations, which were deemed too numerous for its requirements. The ATA team calculated that reducing the number of depots from nine to three would require the demilitarization of approximately 9,500 tonnes of ammunition (see Table 26).

Table 26 Montenegrin MoD 2007 ammunition storage levels and future (post-2007) storage requirements

Location	Post-2007 storage needs (tonnes)	2007 stockpile levels (tonnes)	Remarks
Brezovik	1,450–1,560	7,000	This is planned to be one of the remaining ammunition depots post-restructuring.
Opatovo	0	700	
Petrovići	0	800	
Pljevlja	40–50	400	This is planned to be one of the remaining ammunition depots post-restructuring.
Pristan	0	500	
Rogame	0	500	
Sasovići	0	1,000	
Špiljići	0	50	
Taraš	500–600	750	This is planned to be one of the remaining ammunition depots post-restructuring.
Total	**2,200**	**11,700**	

Source: SEESAC (2007a, Table 1)

Table 27 Montenegrin MoD ammunition storage levels, 2006–11

Warehouses	2006	2011	Reduced
Brezovik	6,191.20	3,383.93	2,807.27
Taraš	849.00	662.26	186.74
Rogame	361.80	149.31	212.49
Pljevlja	223.40	114.48	108.92
Petrovići	707.50	430.62	276.88
Sasovići	1,014.10	502.88	511.22
Opatovo	1,142.50	832.97	309.53
Špiljići	228.30	0.00	228.30
Golubovci	354.30	130.45	223.85
Pristan	1,064.70	711.06	353.64
Total	**12,136.80**	**6,917.96**	**5,218.86**

Source: Montenegro (2011b)

In 2011, in its response to the Small Arms Survey PSSM questionnaire, the Montenegrin MoD reported that it continues to maintain nine ammunition storage sites. With the exception of Špiljići (which has apparently been emptied) and the addition of Golubovci (not listed in the 2007 UNDP ATA), the sites remain the same as those listed in Table 26. The nine sites have a reported total storage capacity of 28,250 tonnes (Montenegro, 2011c, p. 4). As Table 27 indicates, in 2011 they contained a combined volume of 6,900 tonnes.

Five of these sites are reportedly located in populated areas (location unspecified).[120] Three sites—Brezovik, Taraš, and Pljevlja—have been designated 'prospective' depots that are scheduled to accommodate the Montenegrin Armed Forces' ammunition in the future. Montenegro estimates that the combined capacity of the three sites is 4,200 tonnes. If this is correct, the storage volumes presented in Table 27 appear to indicate that the three sites are already filled to maximum capacity (Montenegro, 2011c, p. 4).

The 2007 SEESAC ATA report summarizes the condition of the MoD's ammunition storage sites. It notes that storage safety standards in Brezovic[121], Taraš,[122] and Pljevlja[123] sites were 'adequate' enough to potentially serve as prospective

central storage areas.[124] It also notes that the sites met basic NATO standards for storing ammunition (SEESAC, 2007a, Table 2).

However, the ATA team notes the absence of electricity in buildings. It also describes access denial systems as 'primitive and largely ineffective'. For example, none of the sites had alarms or CCTV cameras fitted to either the ESH or the perimeter fencing. ESH doors failed to meet NATO standards. The team also recommends that the MoD's propellant testing and analysis capacity be improved to carry out propellant master sampler tests[125] (SEESAC, 2007a, Annexes B, E, H).

On 8 July 2006, 200 tonnes of military explosives exploded in the depot of a private company located near Nikšić. According to the Montenegrin MoD representative at the Third RASR Workshop, held in Sarajevo in November 2010, the explosion damaged 1,500 houses in and around the village of Vir. While the cause of the explosion is still unknown, the government reportedly assigned an expert group to investigate the case.

The Montenegrin MoD states that it was not involved in the investigation into the possible causes of the explosion and reports no unplanned explosions at military warehouses or facilities (Montenegro, 2011c, p. 8).

One component of the MONDEM programme is to improve ammunition depot infrastructure and enhance ammunition management systems. The programme included a EUR 1.23 million (USD 1.78 million) infrastructure upgrade[126] of the Taraš ammunition storage site, which is located in Danilovgrad. The government inaugurated the upgraded site in May 2011. The Brezovik ammunition depot is also scheduled for an upgrade, which will require an estimated USD 1.9 million (Montenegro, 2011b).

In addition to the nine ammunition storage sites, Montenegro stores 'reserve' weapons in two WSSs: Kapino Polje and Lepetani. The Lepetani site is reportedly scheduled for decommissioning, leaving the Kapino Polje site as Montenegro's only WSS. The Montenegrin MoD has not released details on the scheduling of these changes (Montenegro, 2011c, p. 4).

Surplus value

The following sections consider current and future options available to Montenegro for recouping funds from the sale, donation, or recycling of surplus weapons and ammunition.

Sales

Montenegro's legislation prioritizes the sale of surplus state-owned property, including arms and ammunition, over destruction (Montenegro, 2009, arts. 21, 22). The government sends classified tenders to registered export companies, which then bid for the surplus ammunition (Lazarevic, 2010, p. 8). Recipients of Montenegro's surplus ammunition include the United States, Italy, and Germany. An inter-ministerial committee must review and approve every export, taking account of a range of factors, including respect for international arms embargoes and end-user certification.[127]

In its response to the Small Arms Survey PSSM questionnaire, the Montenegrin MoD stated that, as of 2011, it had sold 5,145 tonnes of ammunition and 47,156 weapons and other ordnance. The response did not specify a date on which these sales commenced (Montenegro, 2011c, p. 2). The Montenegrin MoD reports having sold the following quantities of surplus weapons and ammunition in 2009 and 2010:

- 2009: sales of 4,756 weapons and 982 tonnes of ammunition to the value of approximately USD 3 million; and
- 2010: sales of 502 weapons and 1,044 tonnes of ammunition to the value of approximately USD 2.5 million (Montenegro, 2011c, p. 4).

As of May 2011 the MoD had sold, but not delivered, an additional 1,400 tonnes of surplus ammunition (out of an estimated surplus ammunition stockpile of 4,500 tonnes). The MoD also states that it is likely to offer an additional 1,300 tonnes for sale during the course of 2011[128] (Montenegro, 2011c, p. 3).

The MoD estimates the total value of its current weapons and ammunition surplus, not counting undelivered sales, at USD 8–9 million. This figure includes weapons and ammunition scheduled for destruction (Montenegro, 2011c, p. 3). In its response to the Small Arms Survey PSSM questionnaire, the MoD included the list of retail prices for selected surplus weapons and ammunition given in Table 28.

Donation

The Montenegrin MoD reports that in 2007 the country donated weapons to Afghanistan through the US Embassy.[129] Rudovic (2007) reports that an August

Table 28 Retail prices for selected surplus weapons and ammunition sold by Montenegro (USD per item)*

Items	Sale value
Weapons and large ordnance	
Semi-automatic rifles	25–30
Automatic pistols	65
7.62 mm assault rifles	55
7.62 mm M72 machine guns	140
7.62 mm M84 machine guns	900
90 mm grenade launchers	200
7.9 mm semi-automatic sniper rifles	430
60 mm mortars	810
82 mm mortars	1,400
120 mm mortars	2,300
122 mm howitzers	8,000–13,000
Anti-aircraft guns 20/1**	2,000
Anti-aircraft guns 20/3**	6,000
Armoured vehicles	15,000
Ammunition	
1,000 pieces of 7.62 mm & 7.9 mm ammunition	70
12.7 mm ammunition (piece)	0.55
Mortar bombs	10–20
Grenade launchers 64 mm (M80)	120
90 mm rockets	200
Defensive hand grenades	2–3
100 general-purpose bombs	300
250 general-purpose aviation bombs	450
Various artillery ammunition	40–60

* No date for these sales was provided.

** Both probably refer to Yugoslav 20 mm cannon, the first (20/1) with a single barrel and the other (20/3) a triple barrel (most probably an M-55 series 3 x 20 mm anti-aircraft gun).

Source: Montenegro (2011c, p. 4)

2007 donation to the Afghan National Army included 250,000 small-calibre cartridges. In its response to the Small Arms Survey PSSM questionnaire, the Montenegrin MoD reports that Montenegro did not donate any surplus weapons and ammunition in 2009 and 2010 (Montenegro, 2011c, p. 3).

Recycling

Montenegro reports that it invests income generated from the sale of demilitarized weapons and ammunition by-products and scrap (R3)[130] into the MONDEM programme budget. It does this to fund additional destruction of surplus ammunition and to upgrade the Taraš and Brezovik ammunition storage sites (Montenegro, 2011c, p. 3).

The TA between the US Department of State and the Government of Montenegro also stipulates that recovered explosives are to be reconstituted for use in commercial blasting explosives and that 'scrap produced by the destruction process will be offered to the contracted factory to be given as part payment to the factory only if the MoD does not wish to retain it' (US DoS, 2007, art. B.8).

In its response to the Small Arms Survey PSSM questionnaire, the Montenegrin MoD reports the following resale prices for selected scrap metals and recovered explosive material:

- aluminium: EUR 1.05/kg (USD 1.52/kg);
- alloyed aluminium: EUR 1.48/kg (USD 2.14/kg);
- brass: EUR 2.49/kg (USD 3.6/kg);
- copper: EUR 5.40/kg (USD 7.8/kg);
- steel class I: EUR 0.27/kg (USD 0.39/kg);
- steel class II: EUR 0.23/kg (USD 0.33/kg);
- steel class III: EUR 0.21/kg (USD 0.30/kg);
- TNT: USD 0.70/kg; and
- plastic explosives: USD 6.00/kg.

The MoD reports that it has not sold RDX or amatol (Montenegro, 2011c, p. 6).

Estimated cost to the defence budget

The following sections address the costs of managing surplus weapons and ammunition stockpiles to Montenegro's defence budget. These burdens include

activities related to the maintenance of storage infrastructure (including ensuring the safety and security of stockpiles and the relocation of ammunition from one site to another); the allocation of personnel to ensure the safe and secure storage, handling, transportation, and accounting of surplus stockpiles; and the costs incurred in demilitarizing or destroying surpluses.

Storage costs

The Montenegrin MoD reports that the cost of routine maintenance (including basic maintenance of buildings, the clearance of exterior anti-fire zones, and lighting tests) amounts to EUR 150,000 (USD 217,000) each year (Montenegro, 2011c, p. 5).

Personnel costs

The Montenegrin MoD reports that it assigns approximately ten guards to each of its ammunition storage facilities.[131] Reports cited above indicate that there are nine ASSs in Montenegro, indicating a total of around 90 personnel.

In addition to these sites, the MoD reports an additional 18 'non-prospective' sites (scheduled for decommissioning), to which it assigns a total of 25 soldiers on a daily basis or 100 personnel per month to guard the facilities. Private contractors provide security to six of these sites, which costs the MoD EUR 115,000 (USD 166,379) annually (Montenegro, 2011c, p. 5).

Demilitarization costs

The Montenegrin MoD's response to the Small Arms Survey PSSM questionnaire did not indicate how much the state spends annually on demilitarization operations and related activities (Montenegro, 2011c).

Priorities for destruction

In its response to the Small Arms Survey PSSM questionnaire, the Montenegrin MoD reports that it intends to prioritize the overhaul (not the destruction) of its 122 mm D-30 howitzer ammunition. The stability of this ammunition is deemed critical because it remains in the arsenals of the armed forces (Montenegro, 2011c, p. 3).

A Serbian representative to the Third RASR Workshop, held in Sarajevo in November 2010, reported that one of Montenegro's priorities is to complete the destruction of all open-air storage sites in the coming months.[132]

Romania

Background

The military strength of the Romanian Armed Forces declined from 180,000 in the mid-1990s to 71,745 active forces in 2011 (Faltas and Chrobok, 2004, p. 87; IISS, 2011, p. 138). This 60 per cent force reduction displaced large stockpiles of surplus weapons and ammunition.

Romania was invited to begin NATO accession negotiations at the Prague Summit in November 2002 and joined the organization on 29 March 2004. A change to NATO calibres and the subsequent redundancy of some Warsaw Pact-calibre weapons only added to Romania's surplus stockpile (Faltas, 2008, p. 82).

Surplus stockpile figures appear erratically in Romania's reports to the UN Programme of Action. In its 2003 report, Romania indicated that it was in the process of destroying 195,510 small arms and light weapons and 36,692,747 pieces of ammunition with financial support from Norway, the United Kingdom, and the United States. The government-owned company ROMARM was reportedly responsible for the destruction programme (Romania, 2003, p. 10).

These surplus figures are lower than those listed in a contract[133] that ROMARM signed with the US Department of State in 2002. The contract was reportedly for the destruction of almost 200,000[134] small arms and light weapons (including pistols, sub-machine guns, machine guns, grenade launchers, and mortars), 1,281,524 pieces of 7.62 mm ammunition, and 62,400,000 pieces of 7.92 mm ammunition (Faltas and Chrobok, 2004, p. 94).

In 2004 the Romanian Ministry of National Defence (MoND) declared a surplus of 1,243,879 small arms and light weapons to the OSCE (Faltas, 2008, p. 98). According to SEESAC (2006d, p. 84), no destruction appears to have occurred in 2005 and 2006. The Small Arms Survey has not identified surplus destruction initiatives by Romania since 2006 and there is little reliable information on the country's surplus stockpiles. Some observers argue that Romania's apparent lack of transparency in relation to surplus stockpiles is the result of the complexity of the state organizations holding weapons and their rapid reorganization (Faltas, 2008, p. 98).

Romania's MoND, MoI, and other public institutions with armed personnel reportedly identify surplus stockpiles on an annual basis. The MoND's Joint Logistic Command and the MoI's General Logistic Directorate make recommendations for the disposal of surplus stockpiles. The Council of National Defence subsequently approves the recommendations at the beginning of each year (Faltas, 2008, pp. 97–98). The Romanian MoND's response to the Small Arms Survey PSSM questionnaire mentions the existence of the MoND's Multi-annual Programme for Ammunition Demilitarization 2009–2015, but does not indicate whether the MoI coordinates its PSSM activities with the MoND (Romania, 2011, p. 4).

Surplus volumes

The Small Arms Survey was unable to obtain reliable data on the size of Romania's weapons and ammunition stockpiles, whether surplus or otherwise. In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoND states that, following the restructuring of its armed forces, operational weapons and ammunition requirements had decreased, resulting in surplus matériel.

The MoND states that the surplus 'occupies important depot capacities with different costs (security, life-time analysis, transportation [and] depot infrastructure maintenance)' (Romania, 2011). It has informed the Small Arms Survey that information related to volumes and values of Romania's operational or surplus stockpiles was 'not releasable for publication'.

Storage sites and conditions

In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoND states that it stores its surplus weapons and ammunition 'separated in similar conditions of security as the operational stockpile'. It did not release information on weapons and ammunition storage sites (Romania, 2011).

The MoND also reports that it has a 'special structure' for the technical assessment of ammunition, that it demilitarizes ammunition according to the results of these assessments, and that the 'Romanian authorities don't interfere

in this process' (Romania, 2011). It is unclear what the 'interference' means in this context.

A longer, although far from expansive, account of Romania's weapons and ammunition storage can be found in Romania's 2002 submission to the OSCE Information Exchange. Chrobok and McDonald (2004, p. 7) synthesise some of this information, which is reproduced below.

National stockpile management and security procedures:

- *Stockpile locations*: Stockpile locations for SALW are decentralised in order to ensure the efficient supply of military personnel. According to 'Law no 17/1996 on firearms and ammunition and other military regulations', a number of safety measures are in place, such as the storage of arms and ammunition in different locations, daily inspections, and adequate security standards of storage buildings. A study on the possibility of centralised storage for different types of military materials, based on NATO standards, is currently under way.
- *Physical security measures*: Physical security measures, such as key controls, storage building doors, alarm systems, lighting systems for building perimeters, guard patrols/dogs, and fencing, are used to ensure strict control. Centralised electronic surveillance systems are not currently used.
- *Access control measures*: Only a restricted number of staff have access to storage facilities. Access within depot premises is allowed only with an entry licence, entry ticket or access delegation. All personnel (military, civilian, or contracted) are subject to security clearance. While arms and ammunition are stored in different buildings, they are administered by the same person (the chief of armament and ammunition depot). This person also has access to the keys to both the arms and ammunition stores.
- *Inventory management and accounting control procedures*: According to Ministry of National Defence Order No. M-8/1999, full records of weapons holdings, use, expenditure and disposal are kept. These records are checked daily by the storehouse administrator and quarterly by the unit commander. Ministry of National Defence Order No. M-81/2000 sets out the auditing procedures. Their results are recorded in unit control registers and in the Audit Directorate Report. They are forwarded to the Minister of National Defence every month.

- *Security in transit*: Regulation A-114/1989 (Arts. 64–75) and other military regulations ensure the security of transportation routes (air, land, and sea). Depending on types, amounts, and situations, arms and ammunition are transported in different vehicles, and are always accompanied by an armed escort.

Surplus value

Research by Lazarevic (2010) suggests that Romania redistributes state surplus to other ministries or state entities that are legally allowed to hold weapons. Romania's 2003 national report to the UN Programme of Action states that the MoND either distributes its surplus free of charge to other public institutions on a case-by-case basis or destroys it (Romania, 2003, p. 10).

Romania's guidelines regulating the sale of goods administered by the MoND suggest that the country also sells surplus weapons and ammunition (Romania, 2005).

Sales

Emergency Ordinance No. 95 of 1999 (modified and approved by parliament as Law No. 28 of 2001) implies that the disposal of surplus should be as profitable as possible (Faltas, 2008, p. 100). The government decision on the approval of guidelines concerning the sale of goods administered by the MoND mandates the company CN ROMTEHNICA SA[135] to sell previously held surplus military matériel (Romania, 2005, art. 2; 2011). The matériel has to be exported within six months, but an extension of an additional six months can be requested (Faltas, 2008, p. 99; Romania, 2005, art. 33.2). If it is unable to arrange a sale abroad, the company is allowed to sell the items on the local market after declassification and demilitarization (Romania, 2005, art. 3.4). The initial sale price agreed through a tendering process should not be lower than the value of the scrap that would result if the goods were destroyed (Romania, 2005, art. 10.4).

In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoND did not estimate the current resale value of its surplus weapons and ammunition, noting that the range of products was wide and that it would not be able to find buyers for much of the surplus. The MoND's reply suggests

that the price of the surplus ordnance is determined by demand and the best available offer. ROMTEHNICA[136] is responsible for evaluating offers. The MoND states that 'the funds acquired by selling the unnecessary goods represent incomes for the [MoND] budget' (Romania, 2011).

ROMTEHNICA's website (ROMTEHNICA, n.d.) provides a list of surplus ordnance available for sale. Although the website does not list prices for matériel, some indications of value can be gleaned from Romanian arms export reports. In 2006–07, for instance, Romania sold a range of matériel to Rwanda. It granted five export licenses with a total value of EUR 469,716 (USD 620,635 in 2007), including an unspecified volume of small-calibre ammunition. This matériel is not listed in Romania's 2008 and 2009 arms export reports, which suggests that it transferred the matériel (sold in 2006–07) before January 2008. The speedy delivery of the materiel and its nature suggest that some items may have been surplus (Romania, 2008a, pp. 17, 23; 2008b, pp. 16, 22).

Donation

In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoND did not mention any significant donations of surplus small arms, light weapons, or ammunition.

Recycling

Romania reports that it sells scrap material recovered from ammunition demilitarization through ROMTEHNICA. Profits from these sales finance additional ammunition disposal (Romania, 2005, arts. 33.3, 33.4). In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoND did not provide indicative resale prices for recycled scrap metal items or explosive substances.

Estimated cost to the defence budget

Storage costs

In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoND did not provide indicative storage costs.

Personnel costs

In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoND did not provide indicative personnel costs.

Demilitarization costs

In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoND did not provide indicative demilitarization costs.

Priorities for destruction

In its response to the Small Arms Survey PSSM questionnaire, the Romanian MoD did not indicate whether it prioritized any surplus ordnance for immediate destruction.

Serbia

Background

In September 2004 the combined armed forces of Serbia and Montenegro included an estimated 65,300 personnel. SEESAC (2005, pp. 1, 19) estimates that these forces held an estimated 677,500 small arms and light weapons, which included a potential surplus of 477,514 weapons.

Also writing of the 2004 period, Griffiths (2010, p. 179) estimates that the armed forces of Serbia and Montenegro's surplus small arms alone (such as assault rifles and pistols, rather than light weapons) numbered anywhere between 789,000 and 1.2 million weapon pieces.

On 3 June 2006 the Montenegrin parliament declared independence from the State Union of Serbia and Montenegro. The two independent successor states each inherited significant surplus weapons and ammunition stockpiles.

With already significant national surpluses, the downsizing of its armed forces added to Serbia's surplus stockpile burden. Under the provisions of the Strategic Defence Review completed in July 2006, the Serbian army downsized from 14 brigades to four (Saferworld, 2007, n. 24). According to SEESAC (2006e, p. 91), Serbia's resulting stockpile figures remained largely guesswork due to 'ongoing poor transparency within the MoD'.

In January 2007 the Serbian MoD reportedly declared to the UN resident representative in Serbia that the country had not earmarked any of its surplus weapons and ammunition for destruction, and that it was selling all available surplus to foreign buyers.[137]

On 19 October 2006 an explosion at a military depot near Paraćin, which injured 20 civilians in nearby towns and villages (SEESAC, 2007b, p. 1), probably spurred on the Serbian government's efforts to address surplus stockpiles. These efforts included two documented initiatives between 2003 and 2009:

- the destruction between 2003 and 2009 of more than 9,000 9M32M Strela 2M (SA-7B) MANPADS missiles, mainly with US support[138] (Bobic, 2011); and

- the destruction between 2005 and 2007 of 1.4 million anti-personnel mines (2,170 tonnes), with NAMSA support (Bobic, 2011).

In April 2007 Serbia declared that its surplus ammunition stockpiles amounted to 23,859 tonnes (GICHD, 2008, p. 10).

The Serbian MoD reports that it has destroyed approximately 4,000 tonnes of surplus ammunition annually since 2006.[139] Table 29 lists annual destruction figures for the period 2006–10.

As Table 30 indicates, the MoD also provides a breakdown of significant quantities of ammunition demilitarized since 2006.

Speaking at the First RASR Workshop held in Zagreb, Croatia in May 2009, the Serbian MoD declared 7,956 tonnes of surplus military ammunition (see

Table 29 Quantities of surplus ammunition demilitarized by the Serbian MoD, 2006–10 (tonnes)

2006	2007	2008	2009	2010	Total
3,500	3,500	4,500	4,000	4,000	19,500

Source: Bobic (2011)

Table 30 Surplus ammunition demilitarized by the Serbian MoD, 2006–10 (by type)

Ammunition type	Quantity (pieces)
Anti-tank mines (TMM-1)	53,089
Mortar shells (60 mm)	22,716
Rifle grenades (M57)	54,912
Artillery ammunition (82 mm)	25,683
Artillery ammunition (90 mm)	49,210
Artillery ammunition (100 mm for T-55 tank gun)	44,316
Artillery ammunition (100 mm for T-12 gun)	33,158
Artillery ammunition (105 mm)	18,453
Artillery ammunition (122 mm for D-30 howitzer)	7,830
Artillery ammunition (130 mm)	5,887
Air bombs	3,528

Source: Bobic (2011)

Table 31 Surplus ammunition earmarked for demilitarization by the Serbian MoD as of May 2009

Ammunition type	Quantity (tonnes)	Demilitarization cost (USD)
Infantry ammunition	2,282	6,000,000
Artillery ammunition	1,488	1,200,000
Missiles	68	79,800
Anti-tank mines	2,800	1,700,000
Ammunition components (unspecified)	42	568,000
G-class ammunition	1,276	3,050,000
Total	**7,956**	**12,598,800**

Source: Serbia (2009b)

Table 31). This figure includes approximately 1,300 tonnes of G-class ammunition (smoke and illuminating).

On 1 January 2011 Serbia announced an end to conscription and the professionalization of the military. Its defence reforms will reportedly reduce the size of the army to approximately 36,000 active personnel (Jovanovic, 2010). This measure is likely to add greater volumes of surplus weapons and ammunition to Serbia's stockpile. In its Strategy on Small Arms and Light Weapons Control, Serbia plans to make material and financial preparations for the safe disposal of surplus stockpiles (Serbia, 2010, p. 6).

The Serbian General Staff retains control over and ultimate responsibility for all Serbian army weapons and ammunition stockpiles (operational and surplus), specifically the Logistics Department (J4) of the army and the Defence Technology Department of the Serbian MoD (Serbia, 2011, p. 1).

In its response to the Small Arms Survey PSSM questionnaire, the Serbian MoD reports that it uses the following criteria to classify weapons and ammunition as 'surplus':

- lack of safety;
- obsolescence; and
- redundancy (no further details provided).

Surplus volumes

The Serbian MoD declared 8,712 tonnes of surplus ammunition in its presentation to the Fourth RASR Workshop held in Ljubljana, Slovenia in May 2011. Table 32 lists the MoD's breakdown of the surplus ammunition.

Table 32 Surplus ammunition declared by the Serbian MoD as of May 2011

Group	Type of ammunition	Pieces	Tonnes
Infantry ammunition	Bullets 12.7 mm Browning	2,000,000	329
	Mortar shells 60 mm armed with impact fuse	371,185	866
	Mortar shells 82 mm armed with impact fuse	188,106	865
	Hand grenades	520,125	400
Sub-total			2,460
Artillery ammunition	Ammunition 20 mm	2,448,325	832
	Ammunition 30 mm	381,305	612
	Ammunition 30 mm AK-230	32,568	12
	Artillery shells 100 mm T-55	15,540	653
	Artillery shells 105 mm	30,866	848
	Artillery shells 130 mm	15,057	1,279
Sub-total			4,236
Aircraft bombs	BL-755 (cluster)	1,000	507
	PLAB-200 (napalm)	1,032	28
	PLAB-350 (napalm)	686	35
	SAB-100 (illumination)	1,455	205
	BLU-107 Durandal (anti-runway)	101	46
Sub-total			821
Surface-to-air missiles	Missiles 'KUB'	162	103
	Missiles 'NEVA'	198	189
Sub-total			292

Anti-ship mines	DPM M66	124	6
	MP71	94	2
Sub-total			8
	Rifle grenades smoke	83,959	65
	Mortar shells 60 mm smoke	18	0
	Mortar shells 81 mm smoke	18	0
	Mortar shells 82 mm smoke	161	1
	Mortar shells 120 mm smoke	12,809	243
	Artillery shells 90 mm smoke	4,457	133
	Artillery shells 105 mm smoke	12,476	254
	Artillery shells 122 mm smoke	76	3
	Artillery shells 155 mm smoke	3,739	
	Hand grenades special AF-1	10,000	35
	Hand grenades special AG-1	8,000	29
	Hand grenades special RB M404 CS	800	2
	Hand grenades special LRB M-3 CS, LRB M-3, RSB	3,960	4
	Box smoke KD-10, KDP-25, KD-45, M3F, M4F, M-90CS	5,480	6
	Rifle grenades chemical school	4,200	3
	Rifle grenades explosive school	9,000	7
	Napalm (kg)		110
Sub-total			895
Total			**8,712**

Source: Bobic (2011)

In a presentation at the RACVIAC workshop held in Pula, Croatia in May–June 2011, the Serbian MoD declared a little more than 90,000 surplus small arms and light weapons. Table 33 lists the MoDs' breakdown of these surplus weapons.

Table 33 Surplus small arms and light weapons declared by the Serbian MoD as of May 2011

Type	Quantity (pieces)
Semi-automatic pistols (all calibres)	12,400
Automatic pistols (all calibres)	7,900
Pistol 26 mm (signal)	3,800
Revolver 357 Magnum	2,100
Sub-machine guns (all calibres)	24,800
Semi-automatic rifles 7.62 mm (all types)	2,500
Automatic rifles 7.62 mm M70 (all types)	17,000
Sub-machine guns 7.62 mm (all types)	7,068
Sub-machine guns 7.9 mm (all types)	1,300
Machine guns 7.62 mm (all types)	200
Machine guns 12.7 mm Browning	37
Machine guns 14.5 mm DShK M38	50
Man-portable rocket launchers RBR-M79 90 mm	8,000
Mortars 60 mm M57	1,400
Recoilless guns 82 mm M60	2,000

Source: Pilipović (2011)

Storage sites and conditions

The 1999 NATO bombing campaign destroyed 70 per cent of Serbia's weapons and ammunition storage depots. Due to lack of storage space, Serbia reportedly stores around 1,500 tonnes of ammunition in the open air (Dragovic, 2011), with obvious risks for ammunition stability and safety.

The 19 October 2006 catastrophe at a depot near Paraćin involved the explosion of 1,300 tonnes of ammunition of various types. More than 4,110 tonnes of explosive ordnance were stored in the depot, 960 tonnes of which were stored in the open (BCSP, 2011, p. 4).[140] Chemical decomposition of ammunition components reportedly triggered an explosion in a stockpile of 20 mm cartridges.[141]

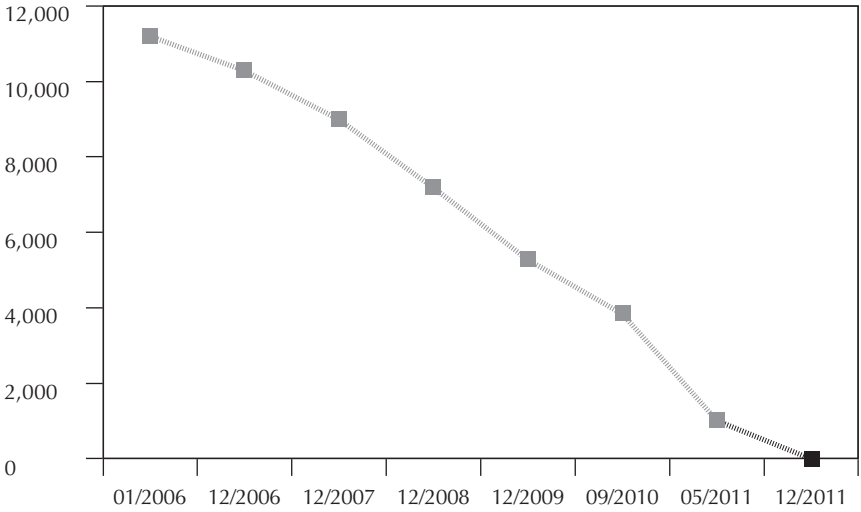
Serbia has enacted measures to prevent further incidents, including an initiative to close all open-air storage sites, which is scheduled for completion in 2011.[142] In 2006 it stored around 12,600 tonnes of ammunition in open-air facilities.[143] By 2007 it had reduced this number to 9,640 tonnes (GICHD, 2008, p. 10). In November 2010 a Serbian MoD representative reported that an estimated 2,300 tonnes remained in open-air storage and that the remaining 1,000 tonnes should be destroyed in 2011.[144] Figure 3 displays the results of the initiative.

Since 2009 the Serbian MoD has increased its storage capacity by approximately 7,900 m². This figure includes 3,300 m² of completed storage space and 4,600 m² of ongoing construction (Bobic, 2011). It is unclear whether this capacity is also used to store small arms and light weapons.

These figures differ, however, from those presented by the Serbian MoD to the RACVIAC workshop held in Pula, Croatia in May–June 2011. Of 34 depots, the MoD reports, a number have undergone significant refurbishment since 2006:

- Five sites have been completely renewed to a capacity of 2,400 m².
- Nine depots are currently under construction, with a capacity of 2,700 m².
- The 20 remaining warehouses have a capacity of 8,750 m².

Figure 3 **Serbia: removal of surplus ammunition (tonnes) from open-air storage, 2006–11**



Source: Bobic (2011)

The MoD reports that its depot upgrade programme has included the provision of new computers and accounting software, the enhancement of a powder stability monitoring laboratory, the provision and use of fork lifts, and the increased use of palletized ammunition (Pilipović, 2011).

Surplus value

The following sections consider the current and future options available to Serbia for recouping funds from the sale, donation, or recycling of surplus weapons and ammunition.

Sales

Serbia reports that it either sells or destroys its surplus weapons and ammunition. Once identified, it offers its surplus for tendered sale to national companies holding a licence to trade military goods, such as the state-owned company SDPR Yugoimport. If it cannot identify a buyer, Serbia destroys the surplus (Lazarevic, 2010, p. 9).

Serbian MoD representatives to several RASR workshops have stressed that destruction is the preferred method of disposal, with only a small proportion of surplus items being sold. Such sales are reportedly 'symbolic' and conducted by around 100 registered companies in Serbia. MoD officials also note that sale is not the best method to dispose of surplus, because it can take between two and three years to find a buyer.[145] In 2011 the Serbian MoD reported sales of at least 3,300 tonnes of ammunition since 2006 (Bobic, 2011).

In 2006 the Serbian government refused to authorize the export of four million rounds of ammunition valued at USD 748,000 to Rwanda. The refusal was in response to requests submitted by the Government of Israel or by an Israeli-based company. Serbia reports that it refused to authorize the exports because of the proximity of Rwanda to conflict zones and the potentially related risks of misuse or diversion (Serbia, 2007, Annex 10/06).

Despite Serbia's refusal to authorize this deal, a number of reports indicate a strong international market for the country's weapons and ammunition. In 2007, for example, the Serbian government is reported to have negotiated a secret USD 833 million deal with Iraq's defence minister for the delivery of new

and surplus conventional weaponry and ammunition. Concerns over the quality of the equipment reduced the contract to an estimated USD 236 million in March 2008 (Moore, 2008).

In 2005 Serbia granted 18 export licences with a combined value of USD 8.7 million for exports involving Israeli-based companies to Burkina Faso, Iraq, Israel, and Rwanda. It had completed USD 5.9 million worth of these exports by the end of 2005 (Serbia, 2007, annexes 2/05, 6/05).

Similarly, in 2007 Serbia granted 11 export licences to Israeli-based companies, which declared Burkina Faso, Israel, Rwanda, Senegal, and Uganda as final destinations for the weapons and ammunition shipments. The value of the items exported was slightly higher than USD 1.3 million, while the value of licences was reported to be USD 1,789,300 (Serbia, 2009a, annexes 2/07, 6/07). The nature of most of the items suggests that Serbia sourced a portion of the matériel from its surplus stockpiles.[146]

Donation

Serbia reports that it does not donate state surplus to foreign states (Lazarevic, 2010, p. 9). In 2011 the Serbian MoD confirmed that Serbia had not donated surplus weapons and ammunition in 2009 and 2010 (Serbia, 2011, p. 2).

Recycling

In its response to the Small Arms Survey PSSM questionnaire, Serbia reports that the Kragujevac demilitarization plant uses the income generated from the sale of by-products and scrap (R3) to finance 'the overhaul of ordnance, disassembly and destruction'. The MoD provided the following resale prices for scrap metal:

- copper: RSD 680/kg (USD 11.41/kg);
- brass: RSD 500/kg (USD 8.4/kg);
- aluminium: RSD 140/kg (USD 2.35/kg);
- steel (low quality): RSD 30/kg (USD 0.5/kg); and
- steel (high quality): RSD 130/kg (USD 2.18/kg).

The MoD estimates the resale price of hexogen at RSD 35/kg (USD 0.59/kg) and TNT at RSD 50/kg (USD 0.84/kg) (Serbia, 2011, p. 3).

Estimated cost to the defence budget

The following sections address the costs of managing surplus weapons and ammunition stockpiles to Serbia's defence budget. These burdens include activities related to the maintenance of storage infrastructure (including ensuring the safety and security of stockpiles and the relocation of ammunition from one site to another); the allocation of personnel to ensure the safe and secure storage, handling, transportation, and accounting of surplus stockpiles; and the costs incurred in demilitarizing or destroying surpluses.

Storage costs

In its response to the Small Arms Survey PSSM questionnaire, the Serbian MoD does not provide indicative storage costs.

Personnel costs

In its response to the Small Arms Survey PSSM questionnaire, the Serbian MoD does not report how much of the defence budget has been allocated to personnel assigned to the guarding of depots or to the maintenance of weapons and ammunition storage sites.

Research indicates that a depot the size of Paraćin (containing more than 4,000 tonnes of ordnance) was guarded by eight soldiers, aided by 12 military dogs (BCSP, 2011, p. 4). No indication is given of the annual expense this represents.

Demilitarization costs

The Serbian MoD reports that the annual costs of a demilitarization facility are around EUR 3 million (USD 4.09 million) (Serbia, 2011, p. 2). Demilitarization at the Kragujevac plant costs approximately EUR 780/tonne (USD 1,064/tonne), but the MoD expects this figure to decrease (time period unspecified) to EUR 460/tonne (USD 628/tonne) (Bobic, 2011).

Priorities for destruction

In its response to the PSSM questionnaire, the Serbian MoD does not indicate whether it has prioritized any surplus ordnance for immediate destruction. However, the 900 tonnes of G-class ammunition included in the current ammunition surplus (Bobic, 2011) undoubtedly represent a challenge.

Slovenia

Background

In 1993 Slovenia reorganized its paramilitary Territorial Defence force, which had operated when the country was part of the Federal Republic of Yugoslavia, into the Slovenian army. The Territorial Defence had seen service in the 1991 War of Independence, growing in size from 16,000 in June 1991 to an estimated 35,000 personnel in October 1991. The force was largely reliant on small arms and light weapons, and did not employ artillery or armoured vehicles (Slovenia, 2011b).

Conscription was abolished in 2003. Slovenia joined NATO on 29 March 2004 and the EU on 1 May 2004. In 2011 the International Institute for Strategic Studies (IISS) estimated Slovenia's active forces at 7,600 and its reserve forces at 1,700 (IISS, 2011, p. 143). The IISS also listed 4,500 paramilitary forces. If these figures are accurate, a combined force of 13,800 in 2011 represents considerable downsizing from the 1991 total of 35,000.

Such downsizing might be expected to have generated considerable weapons and ammunition surpluses, but it is important to note that the Territorial Defence was a lightly armed force and many of its members may have been poorly equipped. For these reasons, it is probably safe to suggest that, in comparison to some of its neighbours, Slovenia's surplus weapons and ammunition stockpile is small.

Slovenia, however, does not report surplus weapons and ammunition stockpiles in its response to the Small Arms Survey PSSM questionnaire. The Slovenian MoD does, nonetheless, indicate that it classifies its surplus weapons and ammunition according to (1) tactical obsolescence and (2) its military doctrine ('structure of the military organization, which dictates the withdrawal of surplus weapons and ammunition from use') (Slovenia, 2011a, p. 2).

Surplus volumes

In its response to the Small Arms Survey PSSM questionnaire, the Slovenian MoD does not report surplus weapons and ammunition.

Storage sites and conditions

The Slovenian MoD reports that its armed forces utilize six sites for the storage of various types of ammunition and two primary sites for the storage of weapons. It reports that all depots comply with technical and security standards for storing weapons and ammunition. Slovenia plans to close one of the ammunition storage sites in the future (no further details provided) (Slovenia, 2011a, p. 3).

The last recorded unintentional explosion at a Slovenian ammunition storage site occurred during the June–October 1991 War of Independence. This event, which occurred on 1 July 1991 at a Yugoslav National Army depot near Idrija, involved the detonation of around 100 tonnes of explosives and caused considerable material damage to the storage facility and surrounding area. The explosion scattered dangerous residue across an area extending several kilometres around the depot. This residue was reportedly cleared in July and August 1991 (Slovenia, 2011a, p. 7).

On 18 June 2007 an explosion at the Poligon 208 specialized destruction site/range near Pivka was not a storage accident, but reportedly due to mishandling during the manipulation of triggers/fuses by employees of the firm Chemical Industry Kamnik[147] (Slovenia, 2011a, p. 6).

Surplus value

Sales

In its response to the Small Arms Survey PSSM questionnaire, Slovenia reports that it did not sell any surplus weapons and ammunition in 2009 and 2010 (Slovenia, 2011a, p. 2).

Donation

In its response to the Small Arms Survey PSSM questionnaire, Slovenia reports that it did not donate any surplus weapons and ammunition in 2009 and 2010 (Slovenia, 2011a, p. 2).

Recycling

The Slovenian MoD reports that it does not 'create income' from the use of R3 techniques (Slovenia, 2011a, p. 2). It is unclear whether this means that R3

techniques are not used or that the resulting income is not channelled back to the MoD.

Estimated cost to the defence budget

The Slovenian MoD did not provide the Small Arms Survey with information regarding the cost of maintaining its weapons and ammunition storage sites. It also did not disclose the numbers of personnel engaged in maintaining and protecting its weapons and ammunition storage sites. The MoD states that 'all necessary measures (technical and physical protection) to provide security of the abovementioned depots are being conducted by SAF' and that '[i]nformation about value of depots, costs of protecting them and number of personnel appointed to guard all depots are [*sic*] not public' (Slovenia, 2011a, p. 3).

Storage costs

In its response to the Small Arms Survey PSSM questionnaire, the Slovenian MoD does not provide indicative storage costs.

Personnel costs

In its response to the Small Arms Survey PSSM questionnaire, the Slovenian MoD does not provide indicative personnel costs.

Demilitarization costs

In its response to the Small Arms Survey PSSM questionnaire, the Slovenian MoD does not provide indicative demilitarization costs.

Priorities for destruction

The Slovenian MoD reports that it currently has two contracts for ammunition, rocket, and explosive ordnance destruction (no further information provided) (Slovenia, 2011a, p. 5).

Endnotes

1 The participants of the conference Towards a Sustainable Solution for Excess Weapons and Ammunition: Policy, Logistical and Financial Aspects of Excess Weapons and Ammunition Disposal, organized by the Regional Arms Control Verification and Implementation Assistance Centre, the International Trust Fund for Demining and Mine Victims Assistance, and the Croatian MoD in May 2011, reached similar conclusions.

2 The Small Arms Survey sent its PSSM questionnaire to the MoDs of each of the RASR participating countries in January and February 2011. As of 1 August 2011 all of the MoDs contacted had responded, except for Bosnia and Herzegovina.

3 Romania, for instance, has not attended a RASR event since the launch of the initiative. For these reasons, the Romania study in this *Special Report* contains limited data. It is important to note, however, that Romania's apparent lack of engagement with the RASR initiative contrasts sharply with its fifth place in the Small Arms Survey 2011 Transparency Barometer (see Lazarevic, 2011).

4 SEE surpluses stockpile levels can be *estimated* academically by comparing troop levels over time and subtracting estimated national requirements from estimated inventories. This implies calculating a ratio of national stockpiles (in tonnes) to the number of serving personnel. However, detailed data on most national stockpiles is incomplete. Without onsite inspection, the resulting estimates do not reveal anything about the quality of the remaining surplus ordnance, nor do they indicate the levels of storage security in the depots.

5 This classification is adapted from Karp (2008, p. 82).

6 Karp (2008, p. 84) uses the ratio of 2.5 firearms per soldier, not as an accurate description of need, but as the highest of all justifiable thresholds. Anything in excess of this ratio is deemed surplus.

7 Reserve ordnance, usually determined as a certain percentage of active service ordnance, may be held in separate storage facilities, although RASR states did not always specify this in their responses to the Small Arms Survey questionnaire.

8 The DAER is the amount of ammunition that a single piece of equipment, for instance an artillery gun, will use in one day of combat or conflict at a certain level of intensity. These figures are usually classified (SEESAC, 2004a, para. 6.1).

9 'Production ammunition' includes ammunition and explosives that have been produced and remain under the control of the manufacturer, awaiting sale.

10 The definition of small arms and light weapons used in this paper follows the definition set out in the *Report of the Panel of Governmental Experts on Small Arms* (UN, 1997):

- *Small arms:* revolvers and self-loading pistols, rifles and carbines, assault rifles, submachine guns, and light machine guns.
- *Light weapons:* heavy machine guns, hand-held under-barrel and mounted grenade launchers, portable anti-tank and anti-aircraft guns, recoilless rifles, portable launchers of anti-tank and anti-aircraft missile systems, and mortars of less than 100 mm calibre.

The terms 'small arms', 'firearms', and 'weapons' are used more or less interchangeably in this *Special Report*. Unless the context dictates otherwise, these terms cover both commercial firearms (e.g. handguns), and small arms and light weapons designed for military use (e.g. assault rifles).

11 RASR workshop participants are mainly MoD representatives, with a few exceptions provided by representatives from MoIs and ministries of foreign affairs.

12 Confiscated, seized, or collected small arms, for instance, are distinct from 'surplus' and often fall under the responsibility of MoIs (see Karadaku, 2011). Lazarevic (2010) shows that in SEE, disposal policy regarding this category is diverse, as these arms can often be absorbed into state arsenals and re-used by state forces.

13 Such as a computerized national small arms and light weapons or ammunition stockpile database, as recommended by SEESAC (2006f, p. 1). Electronic registration and record-keeping software has been introduced by some MoIs to keep track of individual weapons, such as the system that was inaugurated in Montenegro in May 2011.

14 Unit of measurement as stated in the original document.

15 NAMSA (2009a, para. 1.3).

16 Albania (2011e, p. 2).

17 Kotobelli (2011, slide 4).

18 BiH (2011b).

19 BiH (2011b).

20 BiH (2011b).

21 Bevan (2008, p. 5, Table 1).

22 Nikolov (2011, slide 7).

23 UNDP (2009, p. 8).

24 Croatia (2011).

25 According to the Croatian Armed Forces Long-term Development Plan 2008–15 (Bakija, Bogović, and Lončarić, 2009, slide 8).

26 Croatia (2011).

27 Rizeski (2011).

28 Mecinovic (2011e).

29 Rizeski (2011). Class 5 is a US NATO class of supply, comprised of 'Ammunition, explosives and chemical agents of all types' (NATO, 1997).

30 Montenegro (2011b).

31 Montenegro (2011c, p. 2).

32 Montenegro (2011b; 2011c, p. 3).

33 Including 900 tonnes of G-class ammunition (Bobic, 2011).

34 Albania (2011a).

35 Bauer (2011).

36 BiH (2011b).

37 Bauer (2011).

38 Faltas (2008, p. 87).

39 Cattaneo and Parker (2008, p. 78).

40 SEESAC (2006b, pp. 7–8).

41 Croatia (2011).
42 SEESAC (2006b, p. 7).
43 Croatia (2011).
44 Rizeski (2011b).
45 Rizeski (2011b).
46 Montenegro (2011b).
47 Montenegro (2011c, p. 2).
48 Montenegro (2011c, p. 3).
49 Faltas (2008, p. 98).
50 Pilipović (2011).
51 One tonne AUW = 1 cubic metre = 1 unit of space for storage and transportation planning = approximately 50,000 rounds of small arms ammunition (e.g. 7.62 x 39 mm cartridges).
52 1 ton US = 0.907 tonnes (metric); 1 ton UK = 1.016 tonnes (metric).
53 This was confirmed by the NATO Maintenance and Supply Agency as being the current practice among SEE PSSM practitioners.
54 Some SEE MoDs use the term 'perspective' in their presentations when referring to these sites.
55 Physical security measures include controlled access and perimeter measures such as fencing and external lighting, security guards, cameras, perimeter intruder detection systems, and any other ammunition storage security upgrade designed to minimize the risk of illegal entry resulting in the loss or diversion of weapons and ammunition.
56 See, for example, NATO AASTP-1 and AASTP-2 covering safety principles for the storage and transport of military ammunition and explosives (NATO, 2005; 2010).
57 For the purposes of classification for transport, the UN hazard class and division system assigns explosives to one of six hazard divisions depending on the type of hazard they present, and to one of 13 compatibility groups which identify the kinds of explosive substances and articles that are deemed to be compatible for storage. Compatibility group 'G' corresponds to a '[p]yrotechnic substance, or article containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating-, incendiary-, tear-, smoke-producing substance (other than a water-activated article or one containing white phosphorus, phosphides, a pyrophoric substance, a flammable liquid or gel, or hypergolic liquids)'. Examples include flares, signals, incendiary or illuminating ammunition, and other smoke- and tear-producing devices. Compatibility group 'H' corresponds to an '[a]rticle containing both an explosive substance and white phosphorus'. These articles will spontaneously combust when exposed to the atmosphere.
58 For propellants, the primary risk is that of autocatalytic decomposition, which has the potential to result in spontaneous ignition, leading to mass explosions in ammunition storage areas (UNDP, 2009, p. 4).
59 Defined as the length of time an item of ammunition may be stored before its performance degrades (Wilkinson, 2006, p. 231).
60 Since 2005 SEESAC has been assisting Western Balkan countries in developing and publishing national reports on arms exports with a tailored, standardized template and software that facilitate data collection and processing (SEESAC, 2011b).
61 Refurbishing facilities can be prohibitively costly, especially if depots are non-prospective.

62 Demilitarization costs will be dealt with in the forthcoming *Special Report* entitled *The Costs of Demilitarization vs the Costs of Catastrophe*.

63 The MoD's previous ammunition strategy, developed by MEICO in 2004, outlined the AAF's plans for disposing of ammunition surplus, specifying destruction priorities, methods, and costs (Saferworld, 2005, p. 75).

64 Two-thirds (52,380 tons) were planned for industrial demilitarization, the remaining third (19,790 tons) for open burning/open detonation (OB/OD).

65 Email correspondence with Maj. Shkelqim Sina, Albanian MoD, 23 July 2010.

66 Calculations are also available for UM Gramsh and KM Poliçan.

67 EUR 50 (USD 68) per tonne irrespective of distance based on an average journey of 75 km. This includes fuel, personnel, and maintenance costs. This is a nominal figure used for the purpose of estimating Albania's financial contribution to the project.

68 The AAF's new Table of Organization and Equipment (TOE), implemented in 2010, foresees 2,555 officers, 7,240 NCOs and soldiers, and 2,000 civilians (Albania, 2011d). The MoD's J3, J4, and J5 branches are reportedly determining new operational requirements that the new TOE entails (Albania, 2011e, p. 2). The overall process is coordinated by the Demilitarization Board, which is chaired by a deputy minister of defence. Its members include the commanders of major forces (army, navy, air force), MoD directors, General Staff officers, and experts.

69 See note 67, above.

70 The MoD estimates the cost of OB/OD at EUR 200 (USD 274) per tonne, including all AAF resources. NAMSA believes this to be a reasonable figure for the purpose of estimating Albania's financial contribution to the project.

71 These estimates included operational requirements of the BiH Federation Army and the Army of Republica Srpska.

72 The Agreement on the Final Disposal of All Rights and Obligations over Moveable Property that Will Continue to Serve Defence Purposes signed in March 2008 and detailed by Lazarevic (2010) was not implemented until 2009 because of different interpretations by entity institutions (Bauer, 2011). The agreement allows the BiH MoD to utilize weapons, munitions, and explosives only for the purpose serving BiH defence matters. The agreement concerns sales of weapons, munitions, and explosives, but also secondary matériel recycled from demilitarization processes. Any revenue from disposal is split 20 per cent to the state and 80 per cent to the entity that provided the military assets for sale.

73 BIH imports/exports of weapons, munitions, and explosives are to be executed in accordance with the Law on the Control of Foreign Trade in Goods and Services of Strategic Importance for the Security of Bosnia and Herzegovina (OG No. 103, December 2009) attributed to the Ministry of Foreign Trade and Economic Relations, and the Law on the Control of Movements of Weapons, Munitions, and Explosives (OG No. 53, July 2009) attributed to the Ministry of Security. The Ministry of Foreign Trade and Economic Relations issues the respective licences after the Ministry of Foreign Affairs, Ministry of Civil Affairs, State Regulatory Agency for Radiation and Nuclear Safety, MoD, and Ministry of Security have given their consent. The second step, the actual shipment, then has to be authorized by the Ministry of Security and entity bodies. End-user and international import certificates are mandatory

and the BiH exporting company has to come up with a delivery verification certificate upon final execution (EUFOR, 2011).

74 The EWG based its calculation on surplus small arms ammunition prices previously offered by the Scout brokering company in Zagreb, Croatia.

75 According to EUFOR (2011), in 2010 AF BiH surplus weapons and munitions and defence products of Federation defence industry factories were exported to countries under OSCE arms embargo, namely Azerbaijan and Armenia. The embargo violation was also noted by EU Statement No. 635 to the Delegation of BIH to the OSCE Forum for Security Cooperation on 9 February 2011 in Vienna.

76 In June 2010 NAMSA reported the AF BiH surplus as 24,400 tonnes (NAMSA, 2010).

77 For instance, contract number 10-03-41-13-25-04 dated 9 June 2004 and signed between the BiH MoD and the Scout brokering company in Zagreb, Croatia details the sale of USD 1,044,481 of conventional weapons, light weapons, and small arms, and USD 1,032,926 of related ammunition (BiH, 2004).

78 A total of 4,500,000 rounds of small arms and ammunition (<14.5 mm calibre), unguided 128 mm rockets, and multiple rocket launchers (20,000 missiles and 10 RAK 12), as well as 40,000 mortar shells (60 and 82 mm) (EUFOR, 2011).

79 Due to the poor state of accounting systems, depot commanders were reportedly unable to provide a breakdown of the actual running costs of the sites. All expenses were reportedly submitted to the entity MoDs. According to the study, a soldier earned BAM 395 (USD 244) per month; a non-commissioned officer earned BAM 500–530 per month (USD 309–328); and a commissioned officer earned BAM 720–730 per month (USD 445–452) (Turner, 2006, pp. 16–17).

80 In 2010 the AF BiH downsized by 1,400 personnel and abolished conscription.

81 Statement by BiH representative, Third RASR Workshop, Working Group 2, Sarajevo, 3 November 2010.

82 Author interview with Amna Berbic, Justice and Security Cluster coordinator, UNDP BiH, Sarajevo, 1 July 2010.

83 Author interview with Amna Berbic, Justice and Security Cluster coordinator, UNDP BiH, Sarajevo, 1 July 2010.

84 EWG (2010a) reports 195 personnel employed to secure and maintain the non-perspective ammunition facilities. Taking into account the MoD's estimate of 800 people guarding both ASSs and WSSs, this would imply that almost 600 (800 minus 195) people are employed to guard the prospective ASSs and the totality of WSSs..

85 Plan for the Organizational Development of the Bulgarian Armed Forces, adopted by a decision of the Council of Ministers in 1997, modified in 2002.

86 Some documents use the term 'utilization' when referring to the process of dismantling ammunition and the subsequent use of its components.

87 SAS researchers meeting with MoD representatives and US Embassy officials J. J. Fitzgerald and L. T. C. Mathers, Sofia, 11 April 2011.

88 Statement by Bulgarian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

89 Georgiev (2004, p. 2) mentions the following examples: lots of PG-7VM manufactured before 1976, lots of PG-9V manufactured before 1973, lots of PG-9VM manufactured before 1974, and lots of RPG-22 manufactured before 1987.

90 In the late 1990s and early 2000s the transfer of large quantities of arms and munitions to new locations during the downsizing process led to the theft of handguns, sub-machine guns, and rocket-propelled grenade launchers from a number of active military compounds. The surplus and reserve stockpiles stored at the CSTMB seemed to benefit from tighter security measures (Rynn, Gounev, and Jackson, 2005, pp. 89–90).

91 Notes taken by SAS researchers during a visit to Chelopechene, 12 April 2011.

92 Debriefing with Bulgarian MoD, 15 April 2011.

93 Statement by Bulgarian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

94 Statement by Bulgarian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

95 Described in the MoD's presentation as 'decomposition in laboratories, separation of the individual elements and . . . commercial realization of products' (Nikolov, 2011).

96 Small Arms Survey researcher meeting with Marin Ivanov, director of Terem Tsar Samuil EOOD Kostenets, 12 April 2011.

97 Under the National Programme for the Recycling and Destruction of Surplus Ammunition on the Territory of the Republic of Bulgaria.

98 Small Arms Survey researcher meeting with Marin Ivanov, director of Terem Tsar Samuil EOOD Kostenets, 12 April 2011.

99 Under the National Programme for the Recycling and Destruction of Surplus Ammunition on the Territory of the Republic of Bulgaria.

100 Figure provided by Gal Milan Knezevic, head of the Material Resources Directorate, during the International Quality and Productivity Centre Infantry Weapons Conference, London, 27 September 2011.

101 UNDP information from MoD.

102 Assuming 1 tonne (AUW) = 50,000 rounds.

103 One tonne (AUW) = 1 cubic metre = 1 unit of space for storage and transportation planning.

104 Statement by Croatian representative, Third RASR Workshop, Working Group 2, Sarajevo, 3 November 2010.

105 Croatia ratified the Oslo Convention on the destruction of cluster munitions on 5 June 2009. Its obligations under the terms of the convention entered into force on 1 August 2010.

106 Statement by Croatian representative, Third RASR Workshop, Working Group 2, Sarajevo, 3 November 2010.

107 Near the town of Daruvar, approximately 130 km east of Zagreb.

108 Located approximately 4 km from the town of Drnis, some 50 km north of Split.

109 Located within a military training area approximately 6 km from the town of Slunj, some 50 km south of Karlovac.

110 Tests include HPLC, vacuum stability test, UV-Vis spectrofotometer, brown fume test equipment, FTIR, adiabatic calorimeter, DSC, Bergman Junk eqp, Metil violet test, and Hansen test. Also, the MoD has contracts with a non-MoD laboratory for testing the mechanical characteristics of solid rocket propellants by DMA and tensile tester.

111 Statement by Croatian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

112 This preoccupation still features prominently as the current 'way forward' on the CAF agenda (Bakija, Bogović, and Lončarić, 2009, slide 17).

113 Statement by Croatian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

114 Notes from RASR researchers.

115 Notes from RASR researchers.

116 Restructuring processes in the police from 2005 resulted in considerable surplus weapons and ammunition, including MANPADS (see Lazarevic, 2010).

117 In an interview with an SAS researcher (Podgorica, 6 July 2010), Lt Col. Tomasevic of the MoD provided different figures: he said around 1,300 tons were destroyed through this programme and about 1,170 tons remain.

118 Including 48.1 tonnes of AK-20K (melange) oxidizer, 42.7 tonnes of TG-02 missile fuel, and 25.8 tonnes of powder for napalm bombs (Montenegro, 2011a).

119 Statement by Montenegrin representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

120 Small Arms Survey reseacher meeting with Pierre Surprenant, UNDP, Podgorica, 5 July 2010; Small Arms Survey researcher meeting with Vuksanovic Dragoslav, MoD and Military General Headquarters, Podgorica, 5 July; statement by Montenegrin representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

121 Located approximately 90 km from Podgorica.

122 Located approximately 30 km from Podgorica.

123 Located approximately 40 km east of the Bosnian border and 18 km south of the Serbian border.

124 The report recommends that the main police stockpile be stored in a central location, either in one of the three future sites or in one of the other military storage sites, with Rogame being the favoured option.

125 During Third RASR Workshop, held in Sarajevo in November 2010, a Serbian representative reported that Montenegro runs most of its tests on stocks of operational ammunition rather than on surplus ammunition, which may be more susceptible to instability.

126 See Montenegro (2011d).

127 Statement by Montenegrin representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

128 A MONDEM presentation later stated similar figures: 1,467 tons of ammunition sold but not taken and 1,022 tons of ammunition tendered for sale, all of which would be destroyed if a buyer were not found (Montenegro, 2011b).

129 Statement by Montenegrin representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

130 The sale of scrap metal obtained from the demilitarization of surplus weapons generated an estimated USD 390,000 (Keković, 2011), which were reinvested into MONDEM. Another MoD presentation (Montenegro, 2011a) reports a different figure—USD 290,000—but adds that the sale of quantities of scrap metal obtained from the demilitarization of tanks generated an additional USD 594,000 for MONDEM.

131 Small Arms Survey researcher meeting with Lt Col. Tomasevic, MoD, Podgorica, 6 July 2010.

132 Statement by Serbian representative, Third RASR Workshop, Working Group 3, Sarajevo, 4 November 2010.

133 Faltas and Chrobok (2004, pp. 29, 94) estimate the value of the contract at USD 4.8 million.

134 According to Faltas (2008, p. 95), out of the 195,510 military weapons selected for the US-sponsored destruction programme, 166,637 were obsolete Second World War sub-machine guns.

135 ROMARM is another company affiliated to the Ministry of Economic Affairs and Commerce; it disposes of the surplus from the MoI. It either sells the surplus or demilitarizes it within MoND facilities (Faltas, 2008, p. 98).

136 ANCEX, the Romanian National Agency for Export Control, is not mentioned in the Romanian MoND's questionnaire and the agency's relation to ROMTEHNICA is unclear.

137 Griffiths (2010, p. 179) also states that the arsenal that was destroyed between 2006 and 2008 mainly came from weaponry seized from organized crime groups and the civilian population, and declared 'surplus' by the MoI.

138 In October 2004 the Serbian MoD signed an agreement with the United States for the destruction of 5,000 MANPADS (including SA-7s and 2M2J Savas). Serbian MoD officials state that the MANPADS were being destroyed at a cost of approximately USD 400 per missile (Griffiths, 2008, p. 194).

139 Statement by Serbian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010. The figures presented by the representative of TRZ Kragujevac differ slightly: 3,000 tonnes in 2006, 4,200 tonnes in 2007, and a total figure of 19,700 tonnes (Malbasic, 2011).

140 Explosive ordnance stored in the depot included anti-personnel and anti-tank mines; mortar grenades of various calibres; 20, 30, and 40 mm anti-aircraft ammunition; 76, 100, and 128 mm artillery grenades; rocket-propelled grenades for M-57 grenade launchers; 50 kg air bombs; 122 and 128 mm rockets for multiple rocket launchers; MT-3 'Sagger' anti-tank guided missiles; ammunition for anti-aircraft guns; and various types of fuses and detonators. Some of these munitions were intended for destruction (BCSP, 2011, p. 4).

141 RASR workshop discussions.

142 RASR workshop discussions.

143 Statement by Serbian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

144 Statement by Serbian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

145 Statement by Serbian representative, Third RASR Workshop, Working Group 1, Sarajevo, 3 November 2010.

146 This paragraph is adapted from Gobinet and Gramizzi (2011).

147 Three workers died and two were injured.

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